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Al DiGuido
Advertising Director/Magazine Group
3-2-1 Contact Magazine
1 Lincoln Plaza
New York, NY 10023
(212) 595-3456



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Cover Photo: NBC Photo by Gary Null



Two-Wheel Freeway

If you think there's nothing special about a new freeway, you haven't heard about the plans for the West Los Angeles (CA) Veloway. The Veloway will be a two-mile-long elevated freeway—for bicycles only! It'll carry bicyclists safely above the thousands of cars that pass through West L.A.

Ryan Snyder, who's leading the effort to build the Veloway, told CONTACT it will be the world's first bike freeway—complete with a rest area with a bike shop, plenty of parking and even showers for sweaty bikers. If all goes well, the first bikes will roll down the road sometime next year.

Chatty Chimp

Chimpanzees can learn to communicate with humans. That scientific fact is the secret of Project X, an exciting new movie set to open this month. Can actor Matthew Broderick solve the mystery? It's all up to his buddy Virgil—a chimp who “speaks” sign language.

Smart Video

“Be Smart! Don't Start!” That's the message in a hot new music video starring The Jets. They're singing their hearts out to warn kids about a growing problem—alcohol.

It may seem incredible, but some 8- to 12-year-olds are experimenting with wine, beer and liquor. Scientists and doctors say that can be very dangerous to a child's body and brain.

Find out the rest of the story in The Jets' great video, broadcast on CBS-TV. And be on the lookout for the “Be Smart! Don't Start!” magazine, crammed with stories, stars and alcohol factoids.

So “Be Smart!” Watch for the video and the magazine.



Rest Stop

ILLUSTRATION BY NED SHAW

Travelers know: There's nothing nicer than stopping for lunch at your favorite restaurant. Migrating shorebirds agree. Late this month, millions of them will stop for lunch at two favorite spots—beaches in New Jersey and marshes in Kansas.

These birds winter in South America, then head north each spring to breed in the Arctic cold. For some, it's an 18,000 mile trip with just one rest stop. Three-fourths of the shorebirds stop at Delaware Bay, NJ or Cheyenne Bottoms, KS. That's why bird lovers are working hard to protect the Bay and the Bottoms.

PHOTO BY D.C. TWICHELL



The birds arrive in late May or early June. At Delaware Bay, that's the time of year when thousands of horseshoe crabs lay billions of eggs on the beach. The travelers chow down on crab eggs. At Cheyenne Bottoms, insect larvae are on the menu. In a few days, the travelers may double their weight! Then it's on the wing again, for long flights north that burn up all the new fat in only 60 to 70 hours.

Poop Power

Imagine a cow in your yard, peacefully munching on grass. Now imagine a million munching cows. It's easy to see you'd have quite a pile of poop at the end of a day.

Those million cows live in Deaf Smith County, Texas. Twenty-seven feedyards there fatten cattle for butcher shops and restaurants. Over the years, poop in the country has piled up—in mounds up to 50 feet tall.

Now, Deaf Smith County has a purpose for the poop: Power! A manure-powered electric plant, set to open in 1988, will provide enough electricity to run a town of 36,000 people. It's the first poop power plant in the U.S. (People in other countries have used manure as fuel for hundreds of years.)

Deaf Smith County already has a 10-year supply of fuel for the plant. One man says poop power will clear the county's air: "You put a little water on, throw some wind behind them—you get a pretty good stink," says Mike Carr.

ILLUSTRATIONS BY SAM MCLEAN



Good Eye!

Strike three! Another curveball whips across home plate. The only problem is: You didn't see it curve. That's no surprise. A fast pitch can move 100 miles an hour, reaching home plate in half a second.

Umps' eyes are trained to follow the ball's route, but it's tough for fans. That's why Mike Harris thought up his "pitch-watcher."

With the pitch-watching system, two cameras will videotape the ball's flight from the mound to the plate. Then a computer will use the videos to create a 3-D picture of the ball's route.

If Mr. Harris's plan succeeds, fans will be able to see balls break across the plate in slow motion—on TV or on giant video screens in ball parks. Players will be able to study pitches to improve their game. With pitch-watchers on the job, it'll be a whole new ball game.

A Zoo-man Being

Some zoos have apes and some have tigers, but there's one animal you can see in every zoo: the human being. Most walk around freely. But not Alberto Vidal.

Mr. Vidal, an actor, goes to

zoos as an exhibit. Called "Urban Man," he sits behind a desk and does what lots of city people do every day: He reads, writes and eats. (At feeding time, zoo-keepers bring him meals on a tray.)

Zoo visitors from Madrid, Spain to Miami, Florida have enjoyed watching Mr. Vidal. What does "Urban Man" say about them? Not a word. Like other zoo critters, he never talks.



PHOTO BY JANET ROSS/THE GREAT IMAGE LAB

So What's New?

You tell us and you'll get a nifty CONTACT T-shirt—if we print your story. Send us any science stories from the news that have to do with the future. (Be sure to tell us where you heard the story.) Send to:

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Growing Old Everybody's Doing It!

by Richard Chevar

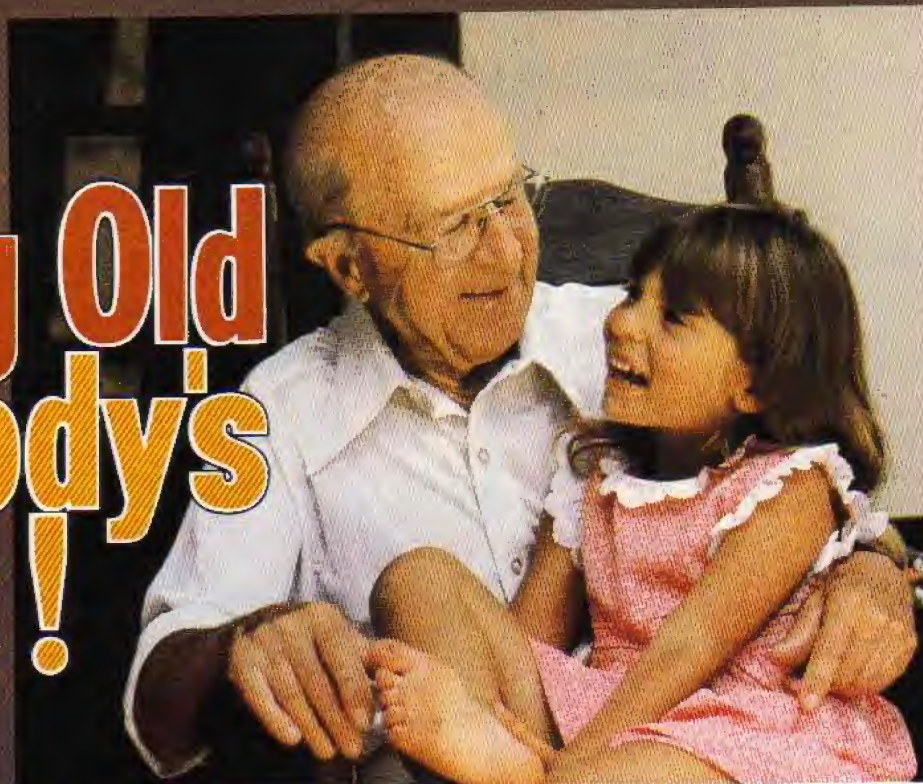


PHOTO: THE STOCK MARKET • GABE PALMER

Lloyd Lambert spends every spare moment skiing. He races on slopes in the United States, Australia and Europe. He also happens to be 86 years old.

Barbara McClintock is a world-famous scientist. She spends 12 to 14 hours a day working in her laboratory. Three years ago she won the Nobel Prize—one of the most important awards a scientist can receive. She's 84.

Evelyn Havens loves to run. In 1986 she ran the New York Marathon. She's also run marathons in New Zealand, London and Moscow. Evelyn is young—she's only 70.

Surprised? You shouldn't be. Most of the 28 million people over 65 in the United States are active and healthy. Of course, not every older person is a marathon runner or a famous scientist. But Lloyd Lambert, Barbara McClintock and Evelyn Havens are not as unusual as you might think. A recent survey by the U.S. Senate showed that only nine percent of all the elderly (people over 65) say they are in poor health.

According to the U.S. Bureau of the Census, by the year 2000, there will be even more people over 65—almost 35 million. Because of this, scientists are studying what happens to us as we get old. They've found out some exciting news. By following a few simple rules about what we eat and what we do, most of us can look forward to a long, healthy, active life.

PHOTO: PHOTO RESEARCHERS, INC. / JUDY MAGE



Above: By the year 2000, 13 percent of the U.S. population will be over the age of 65.

Right:
Lloyd Lambert,
86, started the
70 Plus Ski Club.
It has over
2,500 members.



Below: Evelyn Havens,
70, running in the
Twin Cities Marathon
in Minnesota.



Too Old To Ski?

"I've always been very active," says Lloyd Lambert. "I started skiing in 1915."

Several years ago, Lloyd founded the 70 Plus Ski Club. The club organizes ski trips and races for older skiers from around the world.

"I get lots of letters from people who are in their sixties or younger," Lloyd told CONTACT. "They want to know if they're too old to ski. But our oldest member is 97 and he didn't start skiing until he was 72."

Evelyn Havens was a late starter in her sport. She didn't run her first race until she was 64 years old. A year and a half later she ran her first marathon—a little over 26 miles! Since then she's run 264 races and 24 marathons. The most exciting took place at the Goodwill Games in Moscow in 1986.

"I was a good 40 years older than anyone else in it," Evelyn told CONTACT. "It was a barrel of fun. The people watching along the route kept handing me bunches of daisies and kissing me on the cheek."

News About Getting Old

According to Dr. Michael L. Freedman, of the New York University Medical Center, people shouldn't be surprised by 90-year-old skiers and 70-year-old marathon runners.

"If you keep yourself healthy, you can live to a very old age with very little happening to you," says Dr. Freedman. ➡

Dr. Freedman is a doctor of geriatrics (jer-ee-AT-tricks). That's a doctor who specializes in the problems of the elderly. He told CONTACT that getting old doesn't mean getting sick or weak. However, our bodies do change as we age, starting around age 30.

For example, by the time you're 70, you'll have only half the lung cells you had when you were 30. The same is true for muscle cells. But this doesn't mean that a 70-year-old is very weak or always short of breath. Why? Because we're all born with two to seven times more cells than we need. In other words, we all carry around our own spare parts.

"Losing muscle and lung cells is the reason you can't be a professional athlete much above age 35 or 40," says Dr. Freedman. "But that doesn't mean you can't still play sports. You're just not as good as a twenty-year-old."

And, as scientist Barbara McClintock proves, older people can stay active mentally, not just physically.

"Actually, intelligence keeps going up as long as we live," says Dr. Freedman. "An 80-year-old is much smarter now than when he was 16."

Some older people do begin to lose their memory and other mental abilities. But this only happens to 10 percent of people between the ages of 60 and 80. And it is caused by disease, not just by growing old. Most health problems of older people are caused by disease.

"The older you get, the more likely you are to

pick up an illness," Dr. Freedman says. "Your body doesn't have as much reserve strength. It's harder to fight off disease."

Living Longer

Exactly how old can a person get?

"Every species has a built-in biological clock," Dr. Freedman told CONTACT. "Dogs can live to be 15, maybe 20, the same for cats. The oldest human was a Japanese man who died right after his 120th birthday. The hope of medicine is that if we could end all disease everyone would live between 80 and 120 years."

And medicine has already done a lot to help us live longer. In 1900, an American could expect to live to about 55 years of age. By 1945, it was 62. The average American born today will live to be 76.

But the United States is not the country in the world where people live the longest. In fact, it is number 15. Number one is Japan. Studying other countries has given scientists clues about what leads to longer life.

"Basically, all the things that people hear about how to stay healthy are true," says Dr. Freedman. "You shouldn't smoke, you shouldn't drink, you shouldn't take drugs. These not only lead to a short life, but will give you health problems as you get older."

Diet and exercise are also very important for a long, healthy life.

"In countries where people live longer they

Right:
You're never
too old to be
active, scientists
tell us.



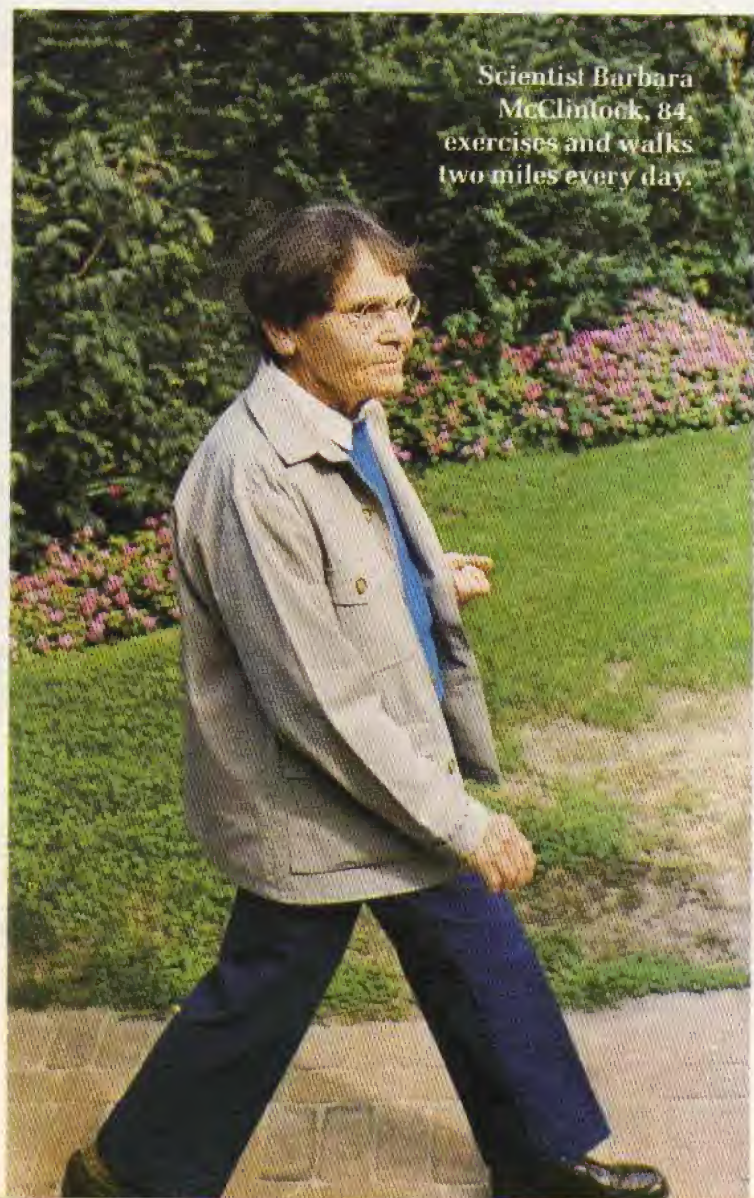
PHOTO: PHOTO RESEARCHERS, INC. © GEOFFREY COVE



PHOTOS THIS PAGE: THE ASSOCIATED PRESS

Left:
Comedian George Burns is one of the most well-known senior citizens. He's 91.

Scientist Barbara McClintock, 84, exercises and walks two miles every day.



tend to exercise more than Americans," says Dr. Freedman. "They eat less red meat and less fat.

"And in all these other countries young people have more contact with older people. So it's very important for older people to have contact with kids. If they want to help their grandparents, then young people should just spend time with them."


Something To Look Forward To

Not surprisingly, people like Lloyd Lambert, Barbara McClintock and Evelyn Havens have been following these rules for years. And they have some advice for young people.

"Keep active," says Lloyd Lambert. "Not only with your body, but with your mind. As long as you stay active, you'll do much better than if you just laze around watching TV."

"I try to eat sensibly," Evelyn Havens told CONTACT. "Fruits and vegetables and very little meat. Before I started running, I ate everything that wasn't nailed down."

And, Evelyn says, her old age is one of the most exciting times of her life.

"Just take care of your body and get involved in anything that will broaden your horizons," she advises. "Then you can have a wonderful, happy, active, exciting old age. Young people have got a lot to look forward to." 

Meet Estelle Getty

TV's Golden Girl

NBC/GENE ARIAS PHOTOGRAPHER

One wig and a lot of make up turn Estelle Getty (center) into 81-year-old Sophia. Bea Arthur is on the left, Betty White on the right.

Do you have to be young to star in a TV show? To find out, CONTACT spoke with Estelle Getty, one of the stars on the NBC-TV series, *Golden Girls*. In case you haven't seen the top-10 show, it's about the lives of four older women who share a house in Florida. Ms. Getty plays the very hip and wise-cracking Sophia. Sophia is the 81-year-old mother of Dorothy, played by Bea Arthur, one of the other stars of the show. (In real life, Estelle Getty is much younger than 81!)

"I get lots of fan mail from kids. They say they love me because I'm fun," Ms. Getty told CONTACT. "I think my height has a lot to do with my popularity. In the show, I can handle people who are bigger than me. For instance, my 'daughter' (Bea Arthur) is five-feet, 10-inches tall. I'm under five feet. It's like David and Goliath—I win with wit rather than with physical power."

Today, Ms. Getty is more active than some people half her age. "I may not be able to run up two flights of stairs anymore, but I can walk up just fine," the actress explains. "And I still exercise daily. I can place my palms flat on the floor without bending my knees."



NBC PHOTO BY GARY NALL

Estelle Getty

Golden Girls Do It All

"In fact, all of the actresses on *Golden Girls*—Bea Arthur, Betty White and Rue McClanahan—are very active. They do their own stunts on the show. If the script calls for bowling or tap dancing, they do it."



PHOTO: CBS

Angela Lansbury is the star of *Murder, She Wrote*.

CONTACT asked the actress how TV programs portray elderly people. "It used to be that older people didn't have very important parts. I think writers thought older characters should just kind of hang around for decoration," she said.

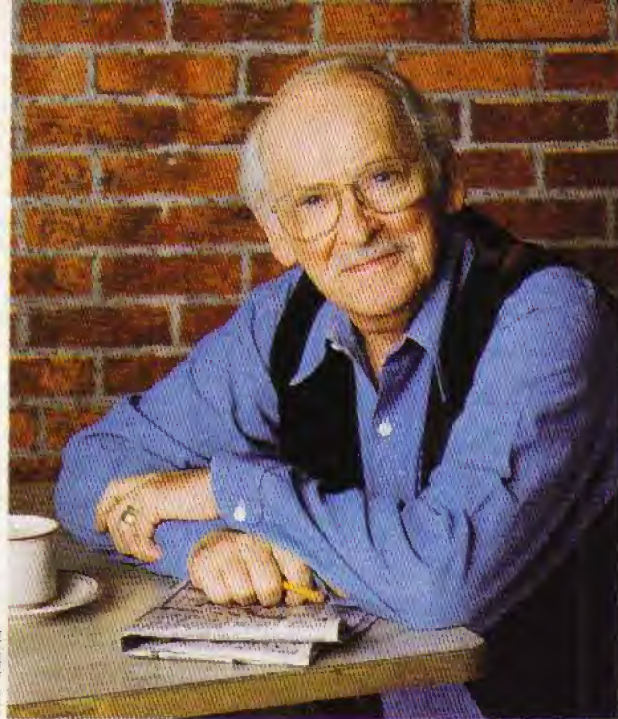


PHOTO: CBS

Barnard Hughes plays a strong-willed grandfather on *The Cavanaughs*.

"But today, older people on TV act like the real people they are. They are active and lively. In many cases they contribute a lot to the story. Older people are no longer sprinkled in a program like parsley decorating some food. And that's great!"


(To see this for yourself, just turn the TV dial. You'll find series like *Murder, She Wrote* and *The Cavanaughs* and *Our House*. In all of these programs, older people have major roles.)

"It's too bad that in America many people think that being old is a 'no-no'. We have to remember that not all old people are bent over and not all old people hobble around.

"Many people are scared of getting older. They think that to get old means they'll be lonely or sick. What lies! It's ridiculous," Ms. Getty says. "Each of us can try to keep our mind and body in shape. I always say, 'If you don't use it, you'll lose it.' Don't stop thinking and learning. Keep on doing what you've done before. You may have to go a little slower, though!" Ms. Getty laughs.

Love and Kindness

"I think young people today should treat older people with love and kindness and respect. Treat everyone the way you want to be treated," Estelle Getty advises.

"That's why I like playing Sophia on *Golden Girls*. I created her character—the way she walks and talks and thinks. Even though I'm not Sophia in real life, I play her with all the love and respect I can find. Love and respect—that's what I want to be treated with as I get older." 

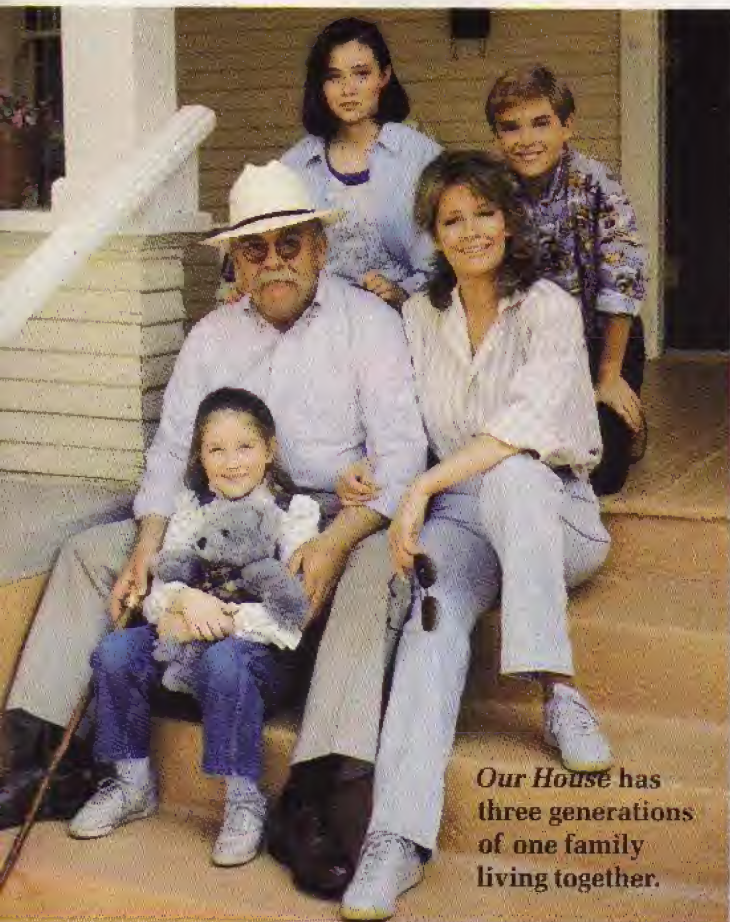


PHOTO BY BOB CARLIN

Our House has three generations of one family living together.

Kooler News

i didn't know that!

The Jets come from an island in the South Pacific that's smaller than New York City. It's called Tonga. It's near New Zealand. Tonga has a king whose name is King Taufa'ahu Topou IV.*

*1986 World Almanac & Book of Facts p. 607

You Know You're Kooler When...



you and your family become pop stars like The Jets.

Mail us your ideas!

Kooler Kids

Moana (Moe-ANA) Wolfgramm is 12 years old. She sings and plays percussion instruments in her family's hot band, The Jets. She plays the conga drums, the tambourine and the woodblocks. Her brothers and sisters play and sing, too. When she's not onstage, Moana loves to collect unicorns. She has glass unicorns and pictures of unicorns and unicorns on t-shirts. "Dumbo" is her favorite movie and Whitney Houston is her favorite pop star.



If you're a Kooler Kid or know of one, send us your photos and letters.

Kooler Moments

in Jet history

Ten years ago, The Jets were not The Jets. They were still in show business, but they had a different act. The Jets wore hula skirts and tropical shirts onstage. They sang songs from the South Sea islands. They didn't make any videos for MTV. Then, at a family meeting in 1978, they decided to change their style. They practiced new songs and learned dance routines. When they were ready, they went on the road again. This time, they were The Jets.

Ask Dr. Know

Dear Dr. Know,

School ends in a month. Most kids are looking forward to the summer, but I'm not. School is the only place I see my friends. Without friends, summer is going to be one long, hot yawn for me. Help.

Your friend,
Summer Blues

Dear Summer,

Make some plans before school ends. Make a date for a backyard sleepover or a trip to the zoo or a softball game. Invite your friends to go with you to The Jets concert. Get people's phone numbers or summer addresses. Call them. Write to them. You don't have to be bored this summer.

Mail your Kooler questions to Dr. Know.

Hey Kids

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with

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Experiment

Plant in a Maze

Spring is here! What better time to try this experiment to find out more about growing plants and light.

What You Need

a small green plant in a pot	a piece of cardboard
a shoebox with lid	tape and scissors

What You Do

1. Cut a hole in one side of your shoebox.
2. Cut out two strips of cardboard. Tape them to the inside of the box, as you see in the picture.
3. Place your plant in the end of the box away from the hole. Make sure the plant will fit when the cover is on. (For best results, choose a small plant that grows quickly.)
4. Put the lid on the shoebox.

5. Place the box near a window, with the hole side pointing toward the window.

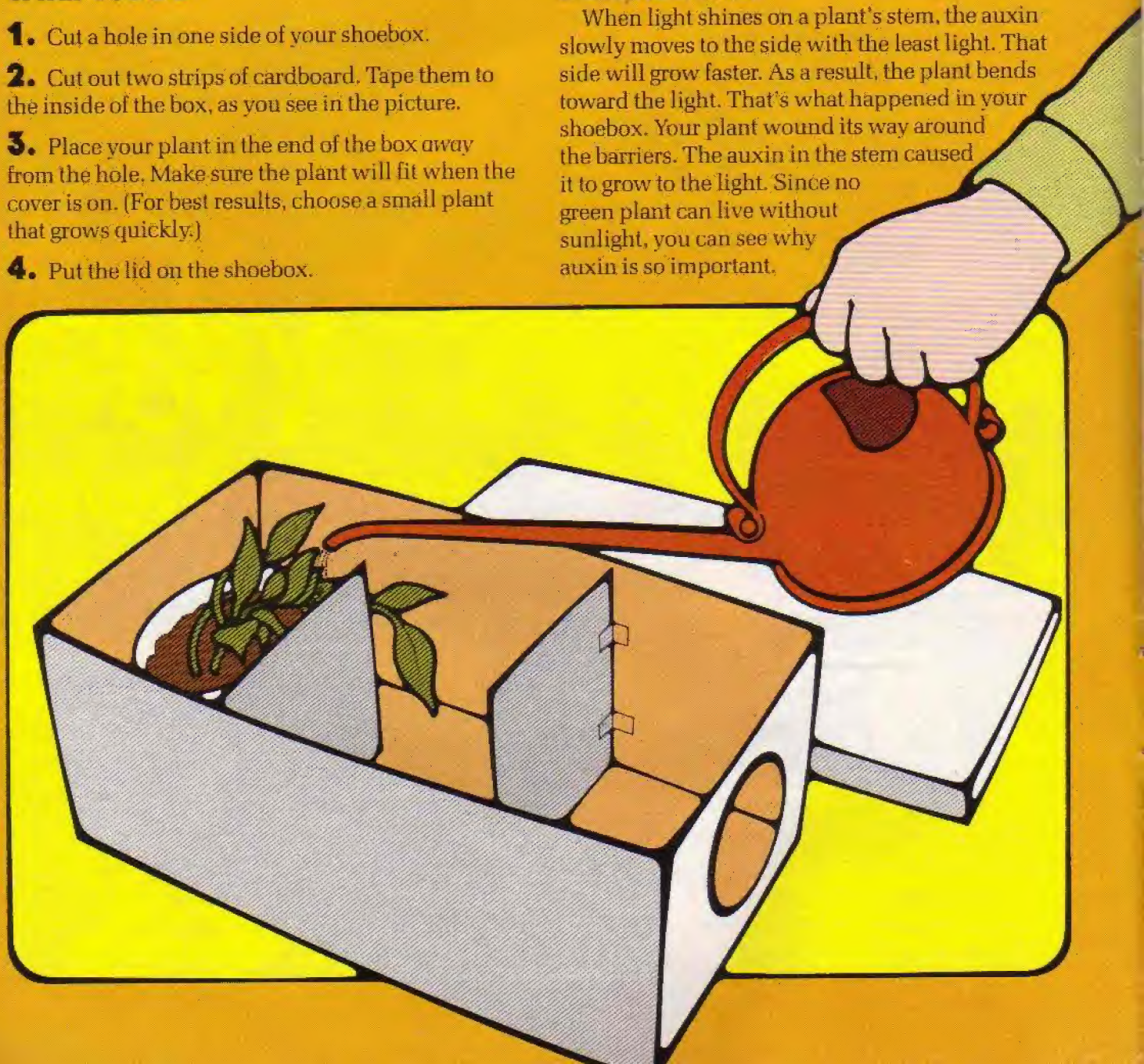
6. Every few days, remove the lid and water the plant. Watch as the plant slowly grows around the pieces of cardboard. If you wait long enough, the plant will grow right out the hole!

Why It Works

Chemicals in your body determine how fast you grow. The same thing is true in green plants. At the tip of a plant's stem is a chemical called *auxin*. A plant always grows quickest at the places where the most *auxin* is found.

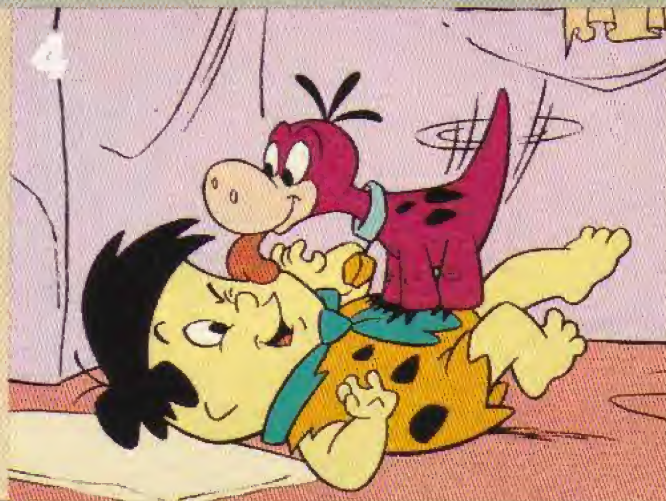
When light shines on a plant's stem, the *auxin* slowly moves to the side with the least light. That side will grow faster. As a result, the plant bends toward the light. That's what happened in your shoebox. Your plant wound its way around the barriers. The *auxin* in the stem caused it to grow to the light. Since no green plant can live without sunlight, you can see why *auxin* is so important.

ILLUSTRATION BY SHELLEY THOMPSON



Babes in Animal Land

A CONTACT Quiz
By B.V. Show



© 1988 HANNA BARBERA PRODUCTIONS, INC.

PHOTO: © ANIMALS ANIMALS MARGOT CONTE



Sometimes when you look at newborn animals, it's tough to imagine that they will become the full grown animals you see at the zoo, in the woods, in books and magazines—or in your own home! But look at a picture of *you* taken just after birth. Ugh! Who'd have thought that tiny, wrinkly-skinned thing with little or no hair and no teeth would turn into...you?

Here are photos of some very young animals. Can you guess the name of the animal babies and what full-grown animals they become? Turn the page for the answers.

PHOTO: ANIMALS ANIMALS © ROBERT PEARCY



PHOTO: © ANIMALS ANIMALS SHICHAO KOLAR

PHOTO: ANIMALS ANIMALS LEEZOVINSKI



PHOTO: BRUCE COLEMAN/JENNAND DES BARTLETT

1



PHOTO © ANIMALS/ANIMALISM STUDIOFFER

CYGNET/SWAN

If you've ever read "The Ugly Duckling," you know that life as a swan can be tough. It isn't easy having parents prettier than you. Young swans are called cygnets (SIG-nits). They are born with dull gray feathers and short necks. They look sort of like ducks. Cygnets ride underneath the mother's wings or on her back. When young swans reach 20 pounds, their feathers start to turn a bright white. Their necks lengthen, and orange and black markings begin to appear on their beaks.

KITTEN/RABBIT

Bald today, hare...er...hair tomorrow. That's the story of the early weeks of the kitten—the name for a baby rabbit. At birth, each kitten weighs less than two ounces. It can't see, it has no fur, and it certainly can't hop around.

The mother rabbit usually gives birth to four or five kittens at a time. She covers them with a blanket made from fur from her body and grass. By three weeks of age, the kittens can see and hear, have fur and longer ears, and can even leave their homes for "short hops." Only then do they start to look like self-respecting rabbits!

PHOTO: ANIMALS/ANIMALISM/CHARLES PALEK

2



3



PHOTO © ANIMALS/ANIMALISM/RICHARD KOLAR

TADPOLE/FROG

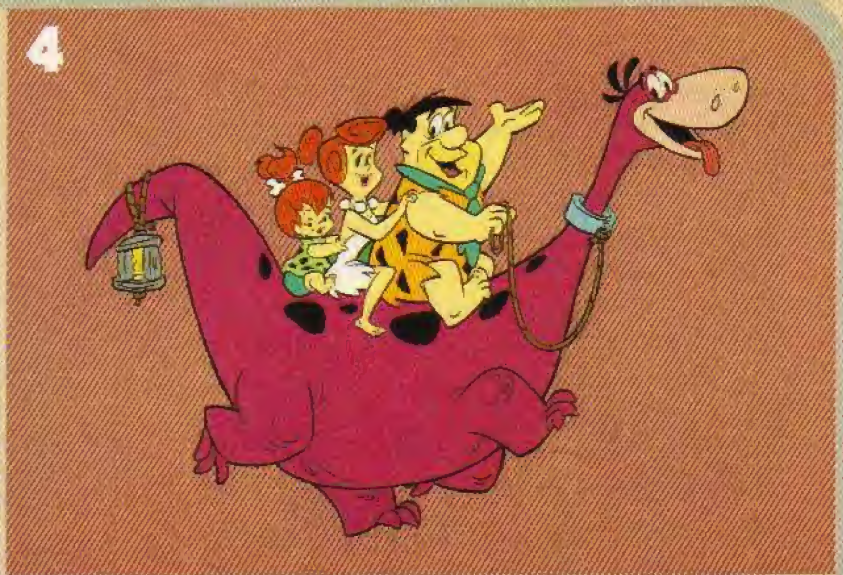
The frog is an amphibian. That means it can survive in or out of water. Life begins in a pond, where newborn frogs, called tadpoles, hatch from eggs. Tadpoles are mostly tails with bulbs on the end. When they're born, tadpoles don't have eyes or mouths. They have gills on their bodies for breathing. At seven weeks, tiny bumps appear through their skin. These become front and back legs. A tadpole's mouth gets wider, its eyes start to bulge, and its skin gets thicker. In about three months, tadpoles lose their gills and tails and develop legs and lungs. Scientists call this kind of total change "metamorphosis."

It still takes about a year for the tadpole to become a full-fledged frog. Then it may live as long as 40 years—a ripe old age for a frog.

BABY DINO/DINO

Dino, the Flintstone's baby dinosaur—also called a “runtasaurus”—grows into a prehistoric version of the watchdog. His job is to look out for the safety and security of the Flintstone family. He's a loud barker, but underneath that spotted scaly hide beats the heart of a true “chickensaurus.”

PHOTO © 1985 HANNA-BARBERA PRODUCTIONS, INC.



CATERPILLAR/BUTTERFLY

The caterpillar is an insect that goes through metamorphosis—a big change—as it grows to adulthood. Caterpillars hatch from eggs. As they grow, they shed their skins several times. (They grow larger skins each time.) After a while, caterpillars attach themselves to twigs with a few strands of the silk they produce. Their skin forms a hard shell called a *chrysalis* (CHRIS-a-lis). The caterpillar turns into a butterfly inside the chrysalis. Once fully grown, it breaks out of the shell-like case and spreads its wings—ready to soar.

PHOTO: ANIMALS ANIMALS © FRED WHITEHEAD



JOEY/KANGAROO

The newborn kangaroo has a face only a mother could love...or recognize! For one thing, a newborn kangaroo is only about an inch long! It can't hear or see, and its rear legs are not even formed. Kangaroos are marsupials. That means they come out of their mother's bodies at a very early stage of development.


After growing inside the mother kangaroo's body for 33 days, the baby kangaroo, called a “joey” is born. Then, without any help, the baby crawls up into a pouch on its mother's belly. It stays in the pouch for about eight months. By the end of that time, it is almost fully developed, complete with a long strong tail and all its fur. 

PHOTO: ANIMALS ANIMALS © HANS & JUDY BESTE



Reaching for the Sky

by Ira Wolfman

A Short History of the World's Tall Towers

What's the tallest building in the world?

If you said, "The Sears Tower in Chicago," you're right—for now. The Sears Tower, completed in 1974, stands 1,454 feet tall—about a quarter of a mile straight up in the air. That's as high as five city blocks placed on their side.

But the Sears Tower is only today's answer to the question. Since 1880 there have been more than 10 "tallest buildings in the world." One hundred years ago, the tallest was just 10 stories high. By 1930, it was 1,250 feet, or 102 stories.

The title, "the world's tallest building," has fascinated people for thousands of years. Even the Bible refers to it, in the story of the Tower of Babel. In the modern world, being the tallest has meant fame for the Eiffel Tower in Paris, France. The Empire State Building in New York City became a legend by being the record holder for 40 years. The building even became a movie star when the world's biggest ape climbed it in the movie "King Kong." But of course, when they remade "King Kong" in the 1970's, they had the big ape climb the World Trade Center. By then, it was taller.

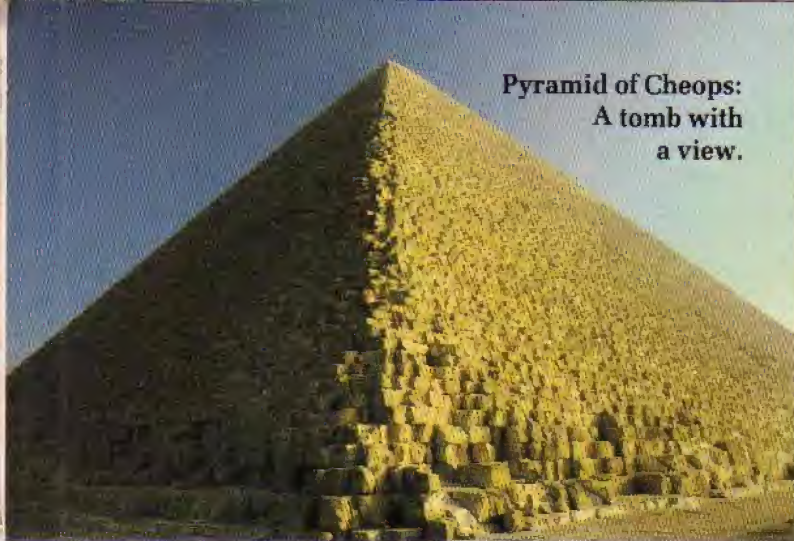
When Cheops Was Tops

For thousands of years, the tallest structure on Earth was a place that no one used much. It was a tomb, a gigantic monument that is known as the Great Pyramid of Cheops.

Sears Tower,
Chicago: The
world's tallest
building.



PHOTO: SEARS STUDIO

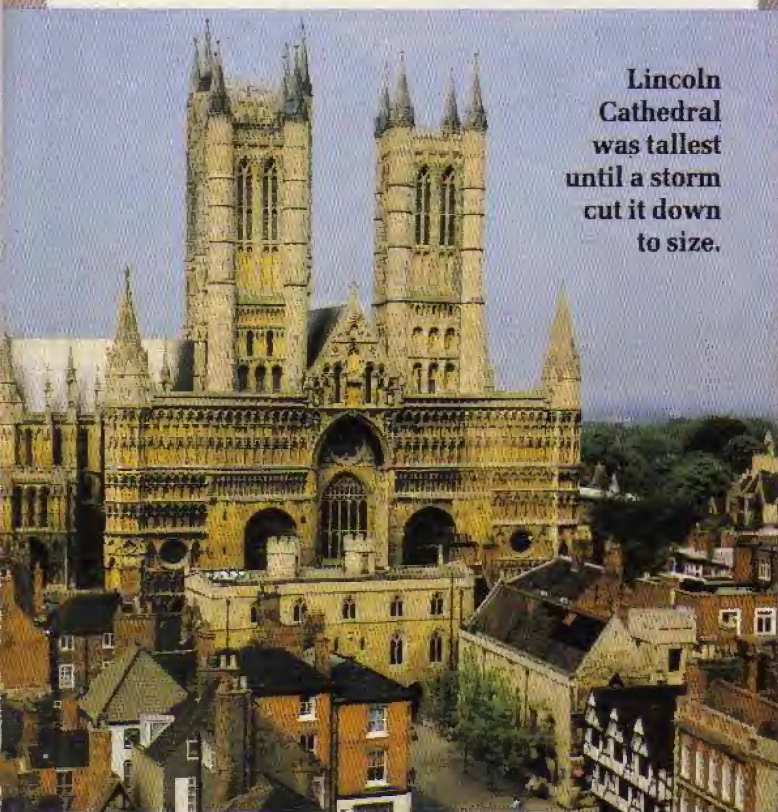


Pyramid of Cheops:
A tomb with
a view.

PHOTO: PHOTO RESEARCHERS INC. © ALLEN GREEN

The Great Pyramid was built in Egypt around 2500 B.C. as a tomb for a king, or pharaoh, named Cheops. It is almost as tall as a modern 48-story building. Not until 1307 A.D. did anything taller come along. The new record holder was a skinny tower on a church in Lincoln, England. The central spire (or tower) of the Lincoln Cathedral was 525 feet high when it was built. It broke the record held by the Great Pyramid for almost 4,000 years!

However, the cathedral's tower, like many others that were built at the time, wasn't very sturdy. Builders weren't really sure how to construct something that high. The Lincoln Tower fell during a storm a couple of hundred years later. Then another church tower in Beauvais, France held the record when it went up in 1569. But four years later, it collapsed.



Lincoln Cathedral
was tallest
until a storm
cut it down
to size.

PHOTO: FRISA, TEDFORD

For the next couple of hundred years, the dream of a tall building was mostly just that: a dream. But in the mid-1800's things started to change. By the 1890's dozens of buildings were so tall that they seemed to "scrape the sky." A nickname for tall buildings was born. Today there are thousands of skyscrapers around the world, and millions of people work and live inside them.

Why did it take so long to build tall buildings? Until four major problems were solved, no very tall building could be safe or comfortable.

Problem One: Getting Up There

The first major problem was that people don't like to climb stairs. Who would want to live on the 21st floor of a building if they had to walk up and down to get there? So the age of skyscrapers couldn't begin until somebody invented a way of carrying people safely upstairs. ➡



Steel construction
made the
Eiffel Tower
possible.

PHOTO: PHOTO RESEARCHERS INC. © SUSAN MCCARTNEY

That somebody was Elisha Otis. In the 1850's he built the first safe passenger elevator. After that, getting to the top of a 10- or 20-story building was no problem. Otis's elevator began a trend that changed the world. Builders realized that taller buildings could hold many more offices and homes without using any extra land.

Problem Two: What to Use?

The next problem was a very heavy one. Huge buildings weigh millions of pounds. In small buildings, wood, bricks or stone form walls that hold everything up. But wood can't support the millions of tons of pressure of a skyscraper. In order for brick or stone walls to do that work, they'd have to be so thick on the bottom floors that there'd be little room for desks or people.

In fact, there is a 17-story skyscraper in Chicago, called the Monadnock Building, that was built completely of stone. It is a very handsome building, but the walls on the lower floors are

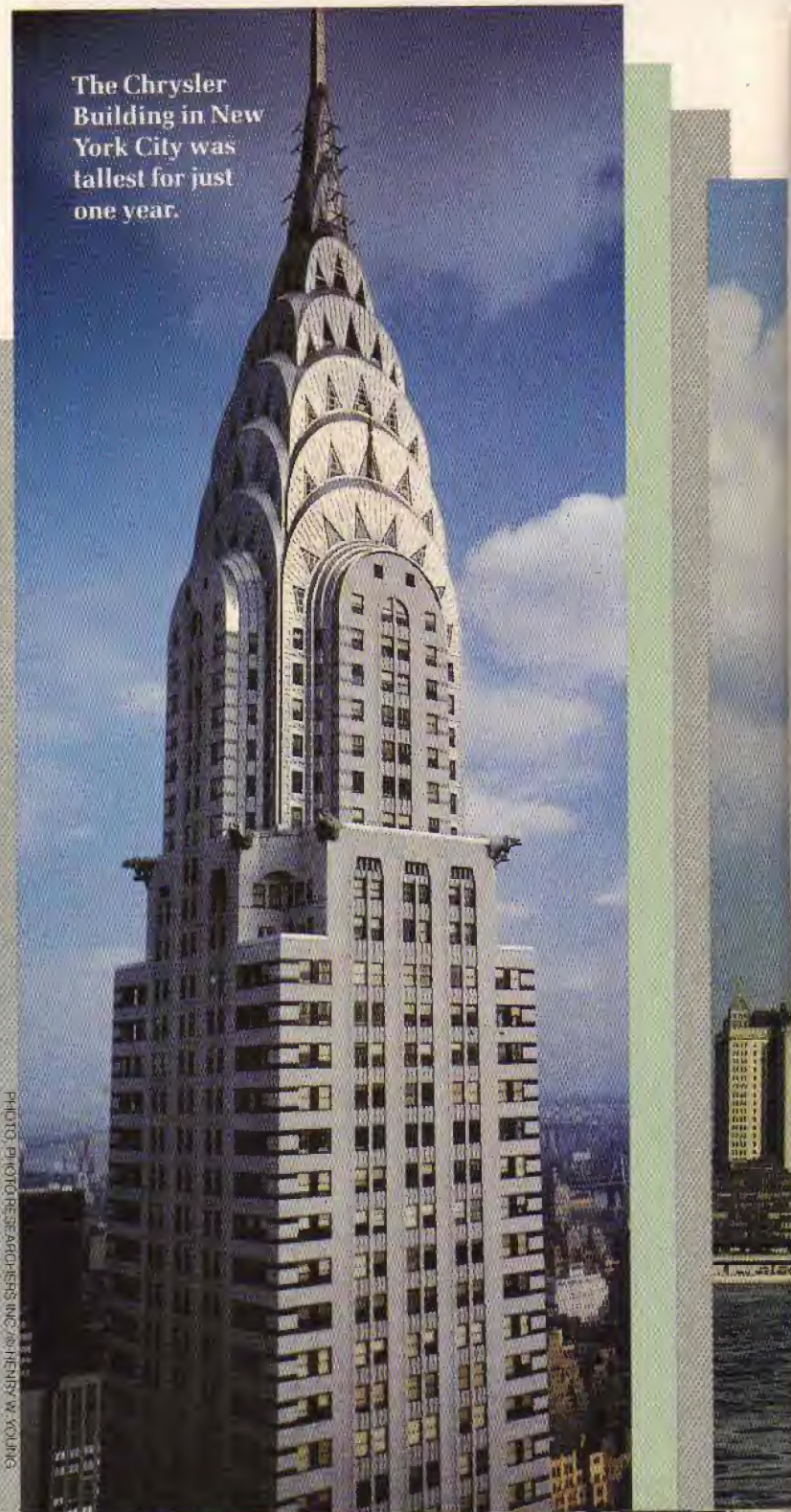
12 feet thick! If the building were 50 stories high, the walls would have to be much, much thicker. If this was the only way a skyscraper could be built, they would never have gotten much higher than the Monadnock Building.

Fortunately, the development of steel solved this problem. The most famous product of this development was the Eiffel Tower. At 980 feet, it was more than twice as tall as anything



The Washington Monument: No building in Washington D.C. is allowed to be taller.

PHOTO: PHOTO RESEARCHERS INC. © MINE MITCHELL



The Chrysler Building in New York City was tallest for just one year.

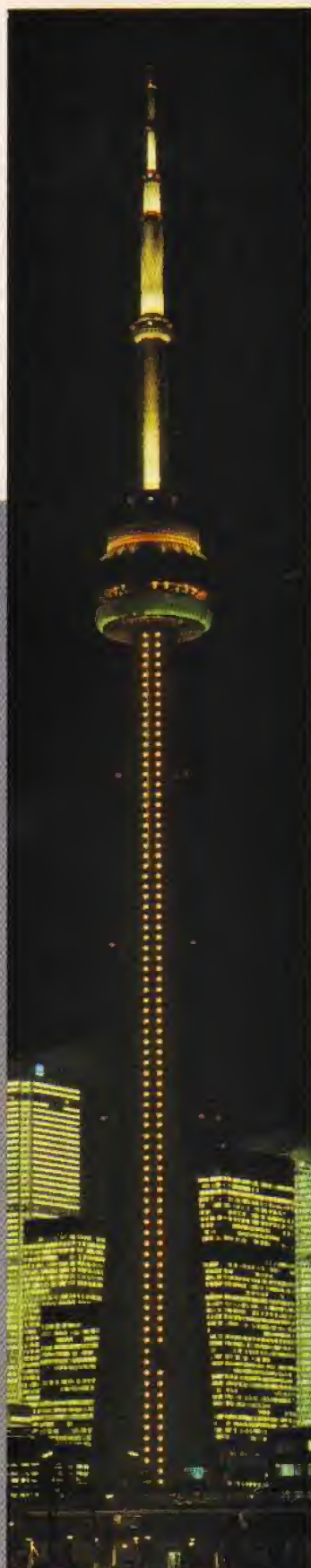
PHOTO: PHOTO RESEARCHERS INC. © HENRY W. KOENIG

that had gone before. Of course, the Eiffel Tower isn't a regular building, but it showed what steel could do.

Now real skyscrapers could be built, based on steel frames called skeletons. These skeletons were made of steel columns and beams that were very, very strong. They could support millions of pounds of pressure. Then glass or stone walls could be placed in front of, or hung on, the skeletons. Because the skeleton frames did the work of holding the buildings up, the walls didn't have to.



The World Trade Center was tops until the Sears Tower.



The CN Tower in Toronto is taller than the Sears Tower, but it's not a building.

PHOTO: PHOTO RESEARCHERS INC. © JOHN MITCHELL

Problem Three: Fire!

Now builders had another problem to solve: What if a skyscraper caught fire? A fire truck is not going to be much help if the fire is 800 feet above it. And where do the people on the 80th floor go if the 78th floor starts burning?

Although no building can be made completely fireproof, tall buildings had to be made in ways that would slow down fires, and protect people in case a fire did break out. These fire-control methods include using fire-resistant or fireproof materials and installing fire sprinklers and electronic fire alarms.

Problem Four: The Blowing Wind

The last major problem that builders had to solve was the wind. Winds at the top of narrow buildings can be very strong. High-speed gusts can blow windows out of their frames or shake a building so much that people inside would get sick from the motion. Skyscrapers had to be constructed so they would barely move at all. Engineers figured out a number of ways to do this.

Today, tall buildings sway a tiny bit, but that motion is almost never felt by people inside. The Sears Tower, 1,454 feet tall, sways only six to 10 inches in 80- to 100-mile-per-hour winds.

How High?

The Sears Tower, 110 stories high, is currently the world's tallest building. But people haven't stopped dreaming of building even higher. Some architects are now talking about buildings that are 160 stories high, or even higher.

And if that makes you dizzy, imagine a building four times as tall as the Sears Tower. That's what Frank Lloyd Wright, a great American architect, once suggested. He even did a drawing of a 528-story building, "The Mile High Tower." Was he serious? Maybe he was just making a point—that people like to aim for the sky. Or maybe he was asking a big question: How big is too big?

There's still no answer—yet. 20

S U P E R S T R U

Here are eight famous skyscrapers from around the world. They are drawn to scale.



Statue of Liberty
New York City
305 ft.

Pyramid of Cheops
Cairo, Egypt
481 ft.

Washington Monument
Washington, D.C.
555 ft.

Eiffel Tower
Paris, France
980 ft.

CLUB

3-2-1-Contact

POSTER



Empire State Building
New York City
1250 ft.



World Trade Center
New York City
1362 ft.



Sears Tower
Chicago
1454 ft.

ILLUSTRATION BY BOB SCOTT



CN Tower
Toronto, Canada
1822 ft.

Factoids

The world's slowest fish is the sea horse. It moves at 10½ inches per minute.



The largest carousel in the world is 10 stories high. It's in Santa Clara, California.

Each year, the average American spends 25 hours and walks four miles making his or her bed.

Chocolate, in the form of cacao beans, was once used as money in South America.

ILLUSTRATIONS BY © JOHN NEZ





Chester Greenwood of
Farmington, Maine
invented earmuffs in 1873.



The first sheep were brought to the U.S. in 1609.



The first Easter egg roll was
in 1877. It took place in
front of the U.S. Capitol.



THE BLOODHOUND GANG

The Case of the Brainy Bandit

By Decky Cheston



WDid I do something wrong?" Vikki wondered out loud as she walked down the hall towards the principal's office.

She had been in the middle of class when her history teacher whispered that Mr. Brainard wanted her in his office—right away! Nervously, she knocked on the door.

"Come in!" ordered the principal. Vikki opened the door and entered. There, sitting in front of Brainard's desk, were Skip and Ricardo!

"I've got a problem that needs your immediate attention," the principal explained.

"That's what my English teacher said this morning when she handed out a 10-page assignment," said Skip.

"I'm afraid this is quite serious," said Brainard. "Our school has been attacked by vandals!"

"Vandals?" said Vikki. "Where?"

"In the east hall," replied Brainard.

"First, we found a line of shaving cream streaked across the lockers," he explained. "Then there was toilet paper unrolled all over the floor. And yesterday—this!" Brainard held up a snapshot. It showed the word "ARI" painted on the wall.

"Mr. Brainard, why don't you just patrol that hall?" Vikki asked.

"We did at first," he replied. "But I can't have my staff hanging around in the hall all day. They've got other things to do."

"I know," groaned Skip, thinking of his English teacher.

"What do you want us to do?" asked Ricardo. "What do detectives usually do? Investigate! Snoop around! Look for clues!"

Vikki sighed. This wasn't exactly the crime of the century, she thought.

"And, uh, ahem," continued Brainard, clearing his throat. "Since this is your school, too, I imagine you won't charge a fee."

"Perhaps we can arrange a little trade," said Skip. "How are you at English papers?"

H i-Tech Hooligan

It was quiet in the east hall. Everyone was in class. The Bloodhound Gang looked around. There were lockers lining each wall, with a stairwell and two classrooms on one side, and the science lab on the other.

"Listen!" said Ricardo. There was a rustling noise coming from behind the lab door.

The young detectives and the principal ducked into the stairwell and peeked around the door. They were just in time to see a shadowy figure come out of the science lab and move slowly down the hall. It was carrying a large box.

"Stop right there and show me your hall pass!" ordered the principal, leaping out of the stairwell.

The figure stopped, turned slowly, and dumped the contents of the box at Brainard's feet.

His shoes were covered in banana peels.

The principal was speechless. "Wow!" said Skip. Mr. Brainard was staring right into the face of a robot!

Motorized Mischief

"It's amazing!" whispered Ricardo as he walked around the robot.

It was about five feet tall, cylindrical in shape, and mounted on three wheels. Its arms appeared to be made of flexible material, with pincers for hands. Its head was round and transparent, with flashing lights inside. Painted on the robot's front was the word "ARI."

"Whoever's in there—the game's over!" said the principal, trying to tug off the robot's head.

"Ow!" said a girl's voice. The principal stepped back. "I'll thank you to keep your hands off me!" The robot was speaking!

"You talk!" said Ricardo.

"Of course," said the robot. "And I have feelings, too. Why are you all staring at me?"

"Sorry," said Vikki. "It's just that we've never seen a real robot before."

"My name is ARI," said the robot.

This is weird, thought Vikki. The robot's voice was so lifelike! It didn't sound mechanical at all.

Just then, the bell rang, and students began to flood the hall. Naturally, a crowd began to gather around ARI.

"I'll bet I know who she belongs to!" Ricardo said suddenly. "Stuart Hanson! A bunch of us are working on projects for the regional science fair. Stuart's been keeping his a secret—but I recognize some of ARI's parts!"

"Then Stuart must be in the science lab!" said Mr. Brainard, almost slipping on a banana peel. "Stuart! Come out of there!"

"Over here, Mr. Brainard!" It was Stuart. Only he wasn't in the science lab—he was running down the stairs from the second floor!

"I was just getting out of math class when I heard the commotion," said Stuart. "I was afraid of this. She got out!"

A Mind of Its Own

The Bloodhound Gang was back in the principal's office. So were Stuart, and Mrs. Bellwood, the assistant principal. Stuart's girlfriend, Melissa Grundy, had come for moral

support. And, of course, there was ARI.

"I want you to know, Stuart, that I hold you personally responsible for the vandalism in the east hall," said the principal, sternly.

"But, sir," said Stuart. "I didn't even know about it. And I was in math just now!"

"Then how do you explain ARI's actions?" asked Mrs. Bellwood.

"Well, I designed ARI—that's short for ARTificial Intelligence—to think independently. Her brain contains a computer, but she can see, speak and act in response to the world around her. I think, though, that she might have become a little too independent."

"She's not doing too much talking now," said Skip. Ever since they had arrived in the principal's office, ARI had been rolling silently back and forth across the carpet.

"She gets like that whenever Melissa's around," Stuart explained. "I think she's a little jealous."



"Maybe I'd better get going, then," said Melissa, heading for the door. "I have to meet some friends for lunch anyway." She waved a brown paper bag in the air as she left.

When Melissa had gone, ARI spoke in Stuart's defense. "All those pranks were my fault, really," she said. "Don't blame Stuart!"

"Don't worry about it," said Mrs. Bellwood. She sounded excited. "I think you're wonderful! Don't you see?" she continued, turning to the others. "We've finally got a chance to win the science fair this year."

"I don't think so," said Ricardo. While Mrs. Bellwood was talking, he, Vikki and Skip had been whispering in a corner. "I think ➔



ILLUSTRATION BY BOB PEPPER

I know a robot who can beat ARI at just about anything!"

"That's not possible," said Stuart. He looked nervous.

"ARI," said Ricardo, "I challenge you to a robot duel!"

A Computer Challenge

Moments later, everyone had followed Ricardo into the school's computer lab.

"That's my competition?" ARI sneered, turning towards a small round object on a table. It was a Turtle computer, a plexiglass dome which rolled around on wheels. It was hooked up by a cable to one of the lab's desktop computers.

"Since the Turtle doesn't talk, I'll introduce it," said Ricardo. "We use Turtles in the computer lab to help us learn about programming—and even geometry. It can even draw with a pen in its 'belly.'"

"Enough talk," said ARI. "Let's start!"

"Okay," said Ricardo. "Skip, you give the orders."

"All right," said Skip. "Let's see you both move one foot forward."

"Easy," said ARI, rolling one foot forward.

Ricardo typed a command into the computer and the Turtle rolled forward 12 inches.

"Now," said Skip. "Rotate 90 degrees to the right." ARI turned to the right, and, after Ricardo typed in the command, so did the Turtle.

"This is getting boring," said ARI. "That stupid turtle can't even talk."

"Excuse me," said Vikki, leaving the room. "Move one foot backwards," said Skip. The Turtle did, but ARI just stood still.

"ARI?" said Stuart, giving her a nudge.

"I think your robot just lost her artificial intelligence," said Ricardo.

"And I found it!" said Vikki, returning to the computer lab. With one hand, she was dragging along Melissa Grundy. With the other, she was holding up Melissa's "lunch bag."

"I think you'll find that ARI is nothing but a remote-controlled machine!" said Vikki. "Here's how ARI moves..." She removed a small radio control device from the bag. "And here's how she speaks!" She held up a microphone.

"We had to be suspicious," explained Ricardo. "Right now, most robots can only be programmed to perform very simple tasks. There aren't any that can think and talk by themselves."

"ARI doesn't think or talk—Melissa operated it by remote control," explained Vikki.

"And did you notice?" said Skip. "Whenever Melissa and ARI were in the same room, ARI suddenly lost her voice!"

"But why the shaving cream and the banana peels?" Mr. Brainard asked Stuart.

"We were trying to get a little publicity for ARI before the science fair," Stuart explained.

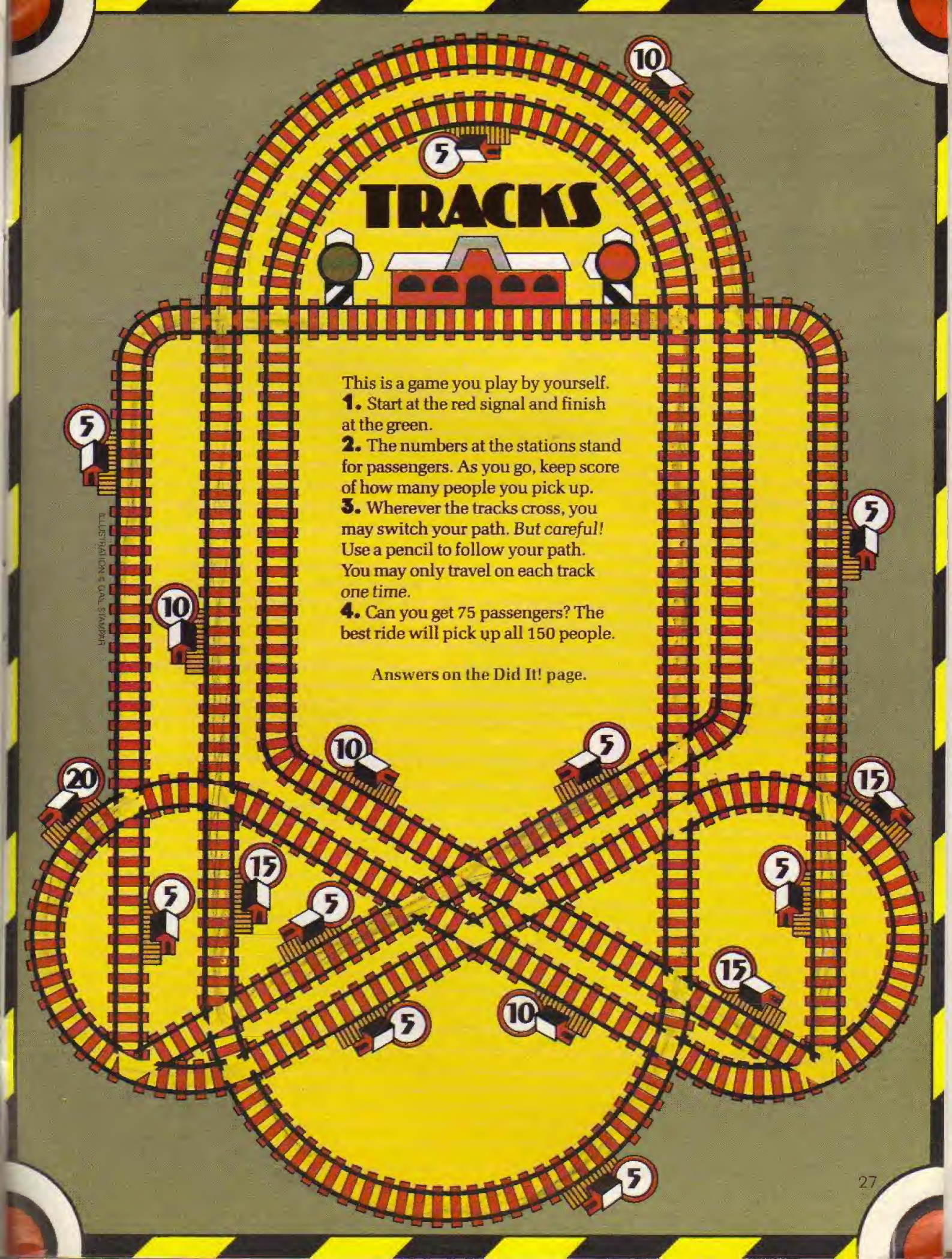
"And what you got instead was a lot of detention," said the principal, leading Stuart and Melissa away.

"Gee," said Skip, turning his attention to the Turtle. "So this thing can draw with a pen! You don't suppose it could write a 10-page English paper?"

**Watch for next month's
Bloodhound Gang
mystery!**



ILLUSTRATION BY DAVE FE BLAND



TRACKS

This is a game you play by yourself.

1. Start at the red signal and finish at the green.
2. The numbers at the stations stand for passengers. As you go, keep score of how many people you pick up.
3. Wherever the tracks cross, you may switch your path. *But careful!* Use a pencil to follow your path. You may only travel on each track one time.
4. Can you get 75 passengers? The best ride will pick up all 150 people.

Answers on the Did It! page.

Contact Lens



PHOTO © STEVE SMALL

Fireworks Beneath the Sea?

What's going on here? Fireworks? No, and they're not Christmas tree ornaments, either. Here's one more clue: These colorful critters are alive. You may have come across one of their relatives in your diggings—the earth-worm!

The swirly, colorful animals in the photo are called Christmas tree worms. (The bright spiked balls you see across the middle are called sea anemones.) You won't find earthworms visiting these boldly colored cousins at home, though. Christmas tree worms hang out in underwater coral reefs.

Most of the worm's body is actually hidden in cracks in the coral. Only its colorful spirals show. Each young worm finds an opening in

the coral and builds a "tunnel" of calcium. The tunnel is a purplish color to help the worm blend in with its surroundings.

Tiny animals, called plankton, get caught in the feathery spirals. When the Christmas tree worm draws the spirals into its mouth to eat the plankton, it snags some oxygen to breathe at the same time.

The spirals are about the length of your thumb. The worm's body can grow as long as your whole hand.

These amazing animals come in all sorts of color combinations: gold and orange, yellow and white, and many different shades of red. Perhaps this is what the Fourth of July looks like in an octopus's garden!

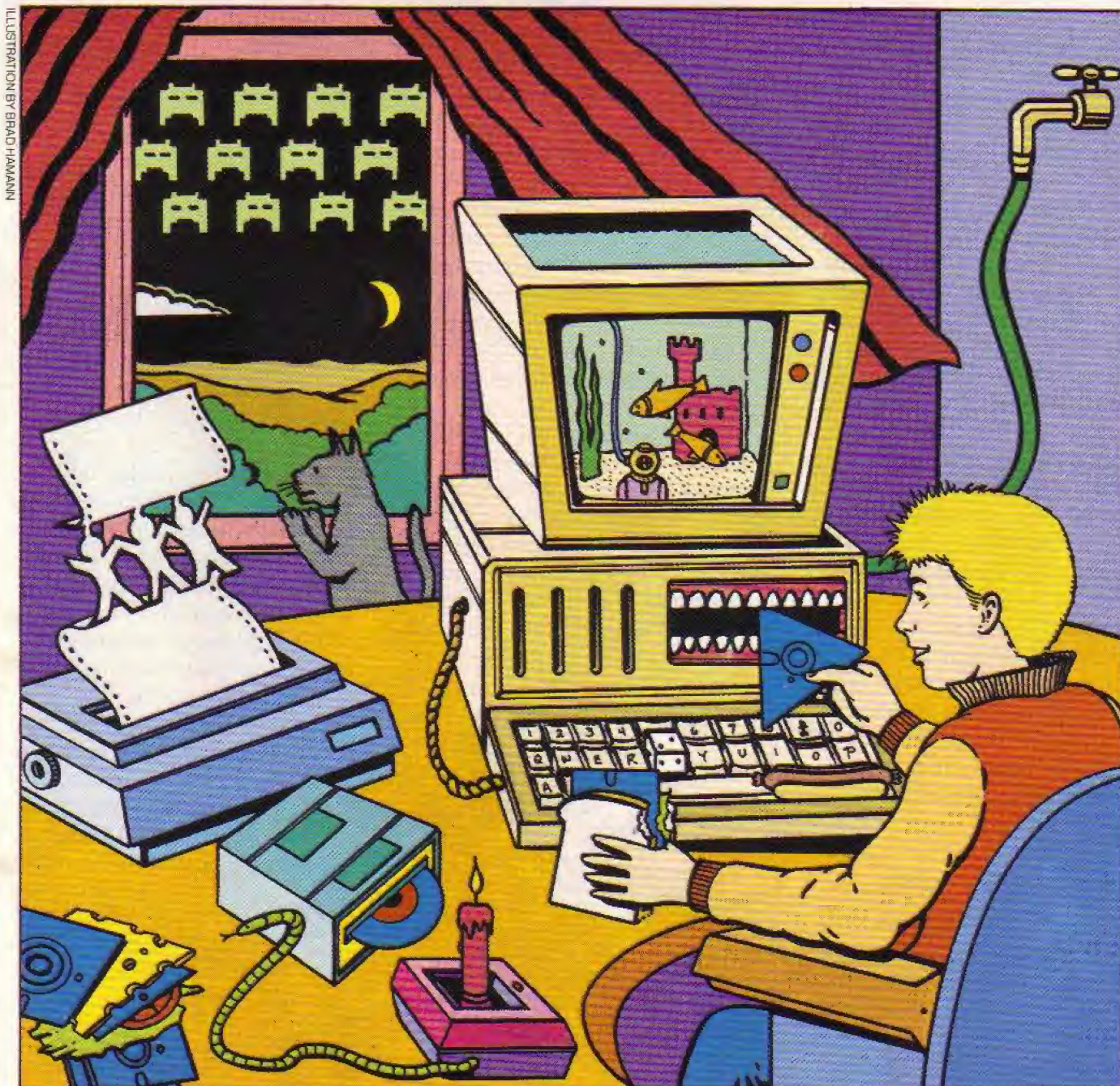
ENTER

THE
HIGH-TECH
WORLD OF
COMPUTERS

Crazy Computer

The boy in this picture is ready to have some computer fun, but we think he's in for a surprise. There are some bugs in his computer sys-

tem, and we don't mean spiders or bumblebees. How many wrong or mixed-up items can you spot? Answer on Did It! page.



The Slipped Disk Show

COMPUTER QUESTIONS AND ANSWERS

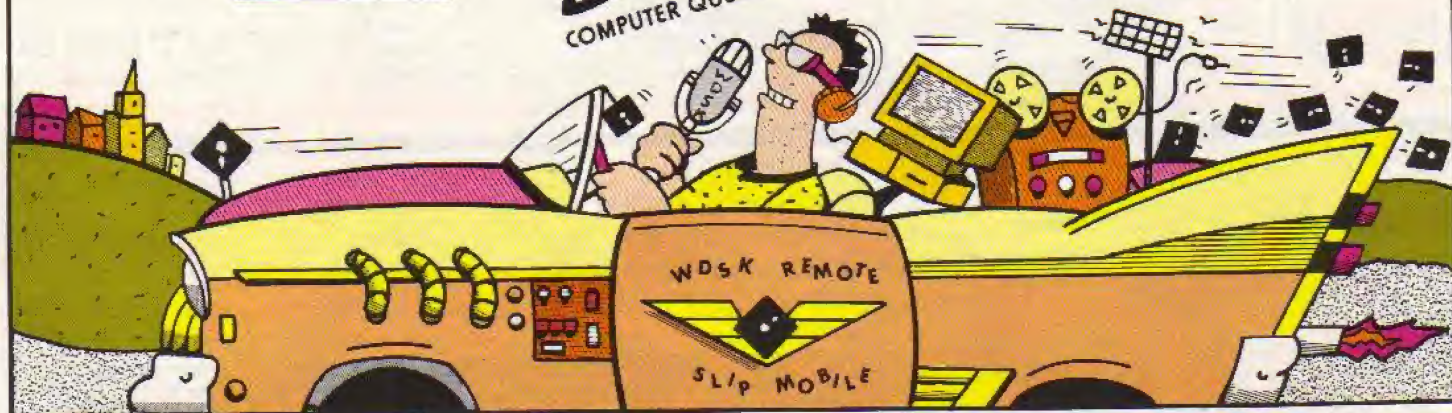


ILLUSTRATION BY CAMERON EAGLE

Hey there, compu-maniacs! This is Slipped Disk, floppy disk jockey, talking to you from the Slip-Mobile. I'm driving around, ready to help anyone who needs the advice of a famous computer expert.

Speaking of advice, I could have used some just now. I was driving along, minding my own business, when all of a sudden there was this building in the middle of the road. There was a slot on the side and a sign that said "25¢," so I put a quarter in, but I couldn't find the screen or the joystick! Then the guy in the car behind me started yelling. It turns out I was at a tollbooth. And I thought it was a drive-in video game!

Anyway, there doesn't seem to be anyone out here who needs my help, so I guess I'll answer this letter I happened to find in the Slip-Mobile's glove compartment. It's from **Beth Blazick**, 10, of Dalton, Massachusetts. Beth asks:

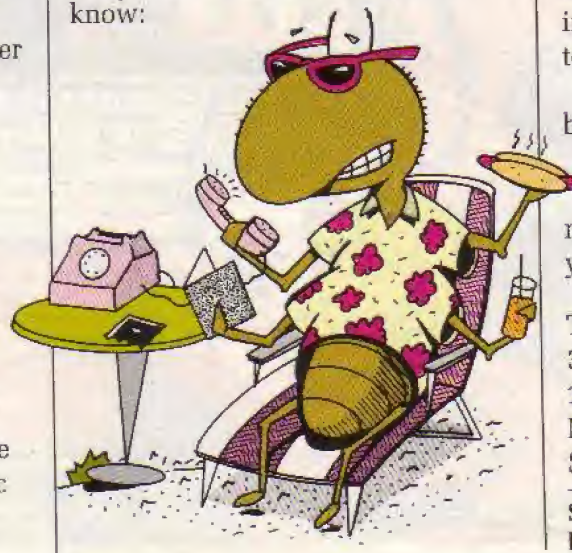
"How do computer cartridges work?"

Beth, you probably have seen computer cartridges that are used with video game machines like the Atari 2600. These are small plastic boxes that plug into a slot in the game machine or computer. Each

cartridge contains a video-game program or some other program.

The programs are stored on a type of computer chip called a ROM chip. That stands for "Read Only Memory." A ROM chip is like the memory chips in your computer, but it is programmed at the factory. You can't change the program (that's why it's called Read Only). And it won't disappear when you turn off your computer.

Speaking of Read Only, I still don't see anyone who looks like they need computer advice, so I think I'll read another letter. This one was kind of squashed under the seat, but I think I can make it out. It's from **Ryan Williams** of Mission Hill, South Dakota. Ryan wants to know:



"What is the main thing computers are used for?"

Ryan, my Uncle Fred uses his computer as a house for his ant farm, but then again, he also keeps his sneakers in the freezer.

Now, you may use your computer to play games like *Mega Space Zombie Hockey*, or to write your school reports, but most computers in the world are used for business.

We all get excited about computers that talk or draw pictures or help pilot space vehicles. But computers are mostly used for big boring jobs like keeping track of bank accounts or credit cards or factory inventories. They help figure payrolls and bills. They also store records for everything from insurance policies to library books to (ugh!) school grades.

Yes, computers certainly do a lot, but one thing they can't do yet is tell you where you are. I'm lost! But I should be back in the studio for next month's show. Until then, send your computer questions to:

The Slipped Disk Show
3-2-1 CONTACT Magazine
1 Lincoln Plaza
New York, NY 10023
See ya!

Slipped Disk always wears his seat belt, especially in the bathtub.

Connie's Computer Chemistry

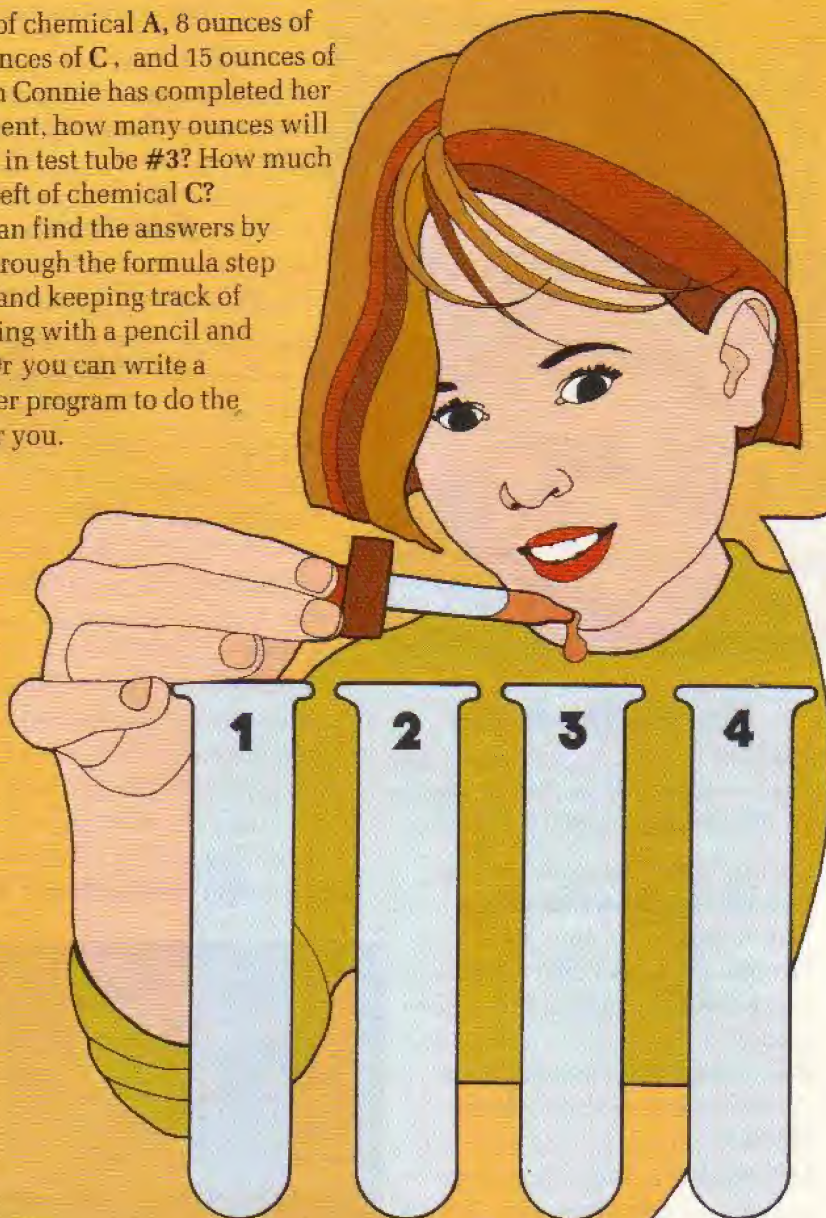
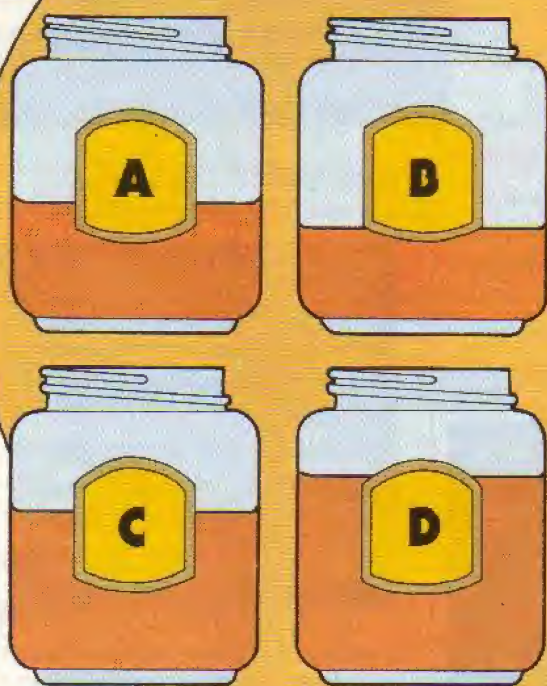
by Richard Chevat

Connie has a problem—her new chemistry teacher is a computer! Connie's homework assignment is to mix some chemicals, using a formula that her computer teacher has printed out. She has to follow the formula *exactly*, or the results could be explosive!

Connie starts with four different chemicals in jars labeled A, B, C, and D. Her assignment is to put the correct chemicals in the right test tubes. At the start, there are 10

ounces of chemical A, 8 ounces of B, 12 ounces of C, and 15 ounces of D. When Connie has completed her assignment, how many ounces will there be in test tube #3? How much will be left of chemical C?

You can find the answers by going through the formula step by step and keeping track of everything with a pencil and paper. Or you can write a computer program to do the work for you.



FORMULA

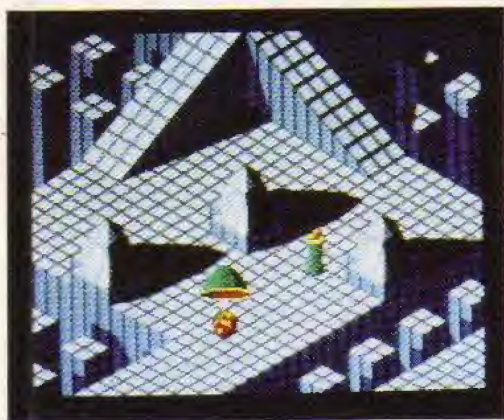
1. Put 2 ounces of chemical A into test tube #1.
2. If test tube #3 has more than 12 ounces in it, skip to step 4.
3. Add four ounces of chemical C to test tube #3.
4. Put 3 ounces of chemical D into test tube #2.
5. Pour contents of test tube #2 into test tube #3.
6. Put 2 ounces of chemical B into test tube #4.
7. If you've done steps 1 through 6 three times, then stop. Otherwise, go back and start over at step 1.

Answer on the Did It! page.

REVIEWS

by Phil Wiswell and Bill Gillette

All software is rated on a scale of one to 10, based on Phil and Bill's overall reaction. A rating of 10 is the very best.



Marble Madness

(Electronic Arts, Amiga, \$49.95; also for the Commodore 64/128, \$29.95)

Description: Players move a ball through a maze in this arcade-action game.

Graphics: The Amiga version is spectacular—equal to the arcade game.

Playability: You can play thousands of times without getting bored.

Originality: A copy of the very popular arcade game.

Rating: 9 ★★★★★★★★

This fantastic game of pure action looks as good and plays as well as its big brother in the arcades. The object is for one or two players to race through a maze by keeping a rolling marble balanced on a series of pathways. There are six levels of play and each level has many screens.

The animation of the Amiga is brilliant and the stereo sound is great. On the Commodore 64/128

the graphics are not as good, but the game is still very exciting and a lot of fun.

Animate

(Broderbund, Apple II, \$80)

Description: This graphics program lets you turn drawings into cartoons.

Graphics: Very good. Very high resolution screens.

Playability: If you like to draw, you won't get tired of this.

Originality: There are others like this, but this is done very well.

Rating: 8 ★★★★★★★★

Animate is a good choice for someone just getting into animation. It's easy to use, even if you're not an artist. All the drawing tools are always at your fingertips, including a help command in case you forget what each tool does.



Once you've created a drawing, Animate allows you to cut and paste it with other drawings or backgrounds. Then it helps you put your drawings into a sequence. Add music, save your work on a floppy disk, and you're ready to put on a cartoon show for your friends.

Labyrinth

(Activision, Commodore 64/128, \$35; also for the Apple II, \$40)



Description: A graphics/text adventure in which you must find your way through a maze, solving puzzles and collecting treasure.

Graphics: Very appealing. You walk your character through a maze of hallways and rooms.

Playability: The controls are a little clumsy, but the game is fun.

Originality: A good maze game—loosely based on last summer's movie.

Rating: 7 ★★★★★★★★

The start of this game is all text. You wander through the streets of a strange town, meeting lots of other characters. Don't pass any of them by, because they all hold clues to your adventure.

Once you solve several puzzles, you'll find your way to a movie theater where you will learn the challenge of Labyrinth.

After the movie, the game is a mixture of text and graphics. You enter a maze of rooms leading to a castle where you will meet more characters, try to avoid traps and find treasure.

Uninvited

(Mindscape, Macintosh, \$49.95)

Description: A graphics/text adventure that's very difficult, but one of the best we've seen.

Graphics: In black and white, but very detailed.

Playability: This game takes a long time, but we were hooked into coming back again and again.

Originality: Set in a horror movie—a new twist in adventure gaming.

Rating: 9 ★★★★★★★★★★

This adventure begins like an old horror movie. Your car crashes on a dark country road. You are alone. You find your way to a spooky dark house sitting all by itself in the middle of nowhere. Naturally, there's nobody home. Still the door is open, so you go inside to one of the scariest adventures you'll ever play.



The extremely detailed Macintosh graphics bring the old mansion to life, and excitement and suspense lurk around every corner. Game play is made easy—there is no typing necessary. You use the mouse to move your character, open and close things and pick things up. If you like scary stories, try *Uninvited*. But be warned—it will take many hours to solve. Still, if you don't mind a real challenge, and you own a Macintosh, this is one of the best adventure games around.

Stickybear Music

(Weekly Reader Family Software, Apple II, \$40; also for the Commodore 64/128)

Description: Teaches you the basics of writing music.

Graphics: Clear and accurate musical staff and symbols.

Playability: Another program that depends on your creativity—for those interested in music.

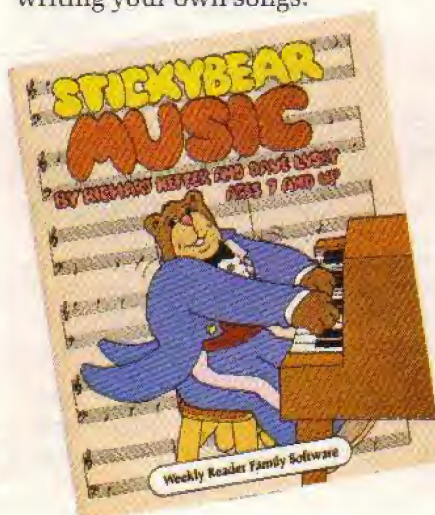
Originality: There are several programs like this, but this is especially good for beginners.

Rating: 7 ★★★★★★★★

Writing music is not simple, at least, not writing music people will want to listen to! Stickybear Music will help change that. This program is a lot of fun, and easy to use.

There are already songs on the disk, and you can change them any way you want. Or you can write your own songs from scratch by placing musical notes on a blank "sheet" of music paper. Once you are done, the program will play your masterpiece for you.

You can save your songs on a disk, or print them out on a printer. There is a brief section of the program that teaches you the basics of music, but you'll probably learn more just by having fun writing your own songs.



The Game Show

(Advanced Ideas, Apple II, \$40)

Description: A trivia quiz done like a television game show.

Graphics: A stage, a game show host and two "celebrity players."

Playability: A lot of fun for this type of game. There are several expansion disks you can buy with more questions.

Originality: A remake of an old program, but the new "game show" format is a good addition.

Rating: 8 ★★★★★★★★

This quiz game is presented as a TV game show, complete with stage, host and celebrity players. You compete with a friend to see who can win 100 points by answering questions in different categories. You can play the game by yourself, but playing with a friend is a lot more fun. You both have to guess the answer to the same question, and the "celebrity players" give you hints.

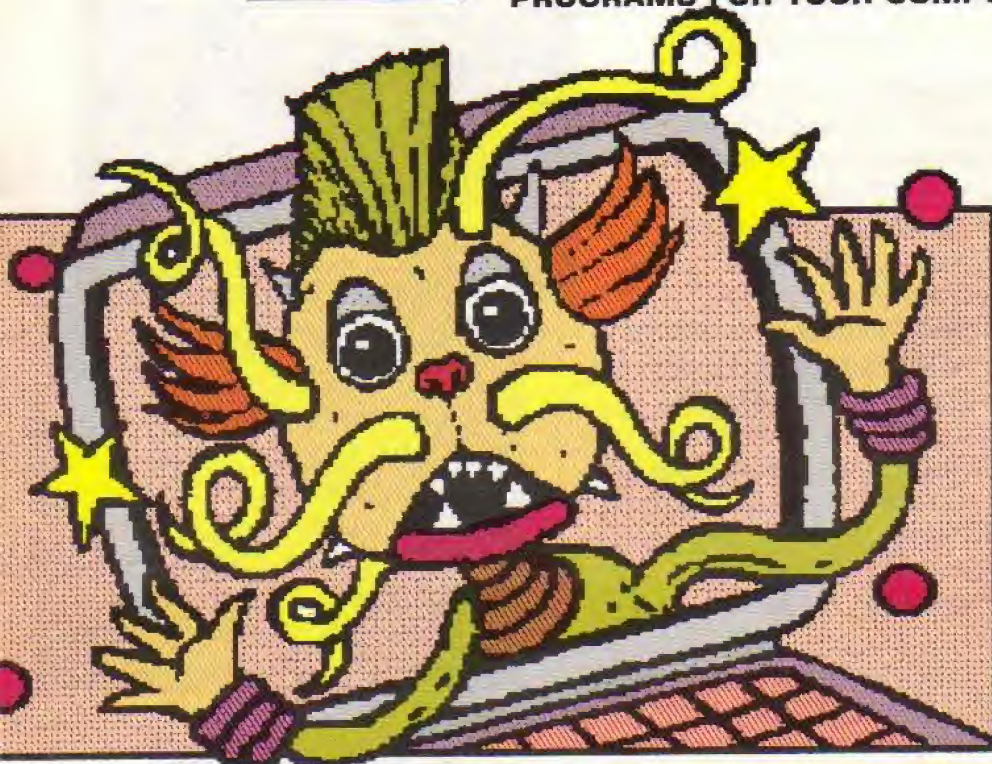
The categories include: The Solar System, Mammals, and U.S. Presidents. There are 40 games on the disk, but you can buy extra game disks. Even better, you can create your own questions and answers. This is an excellent game for the home or the classroom.

Phil Wiswell, father of three, is a computer consultant and writer.

Bill Gillette, age 16, is a student with a passion for computers.

basic TRAINING

PROGRAMS FOR YOUR COMPUTER



Space Chase

Here's an outer space adventure game that's more fun than a barrel of Vulcan space mice. The game is simple to play. In each situation, your control panel will show you a list of things you can do. Just type in the number of your choice and see what happens. **Hint:** You'll have to read carefully.

The program is for Apple II computers. To adapt it to other computers, just follow these instructions:

Atari 400/800, 400XL/800XL

Change all HOME statements to
PRINT CHR\$(125)

Commodore 64/128

Change all HOME statements to
PRINT CHR\$(147)

IDM

Change all HOME statements to
CLS

```

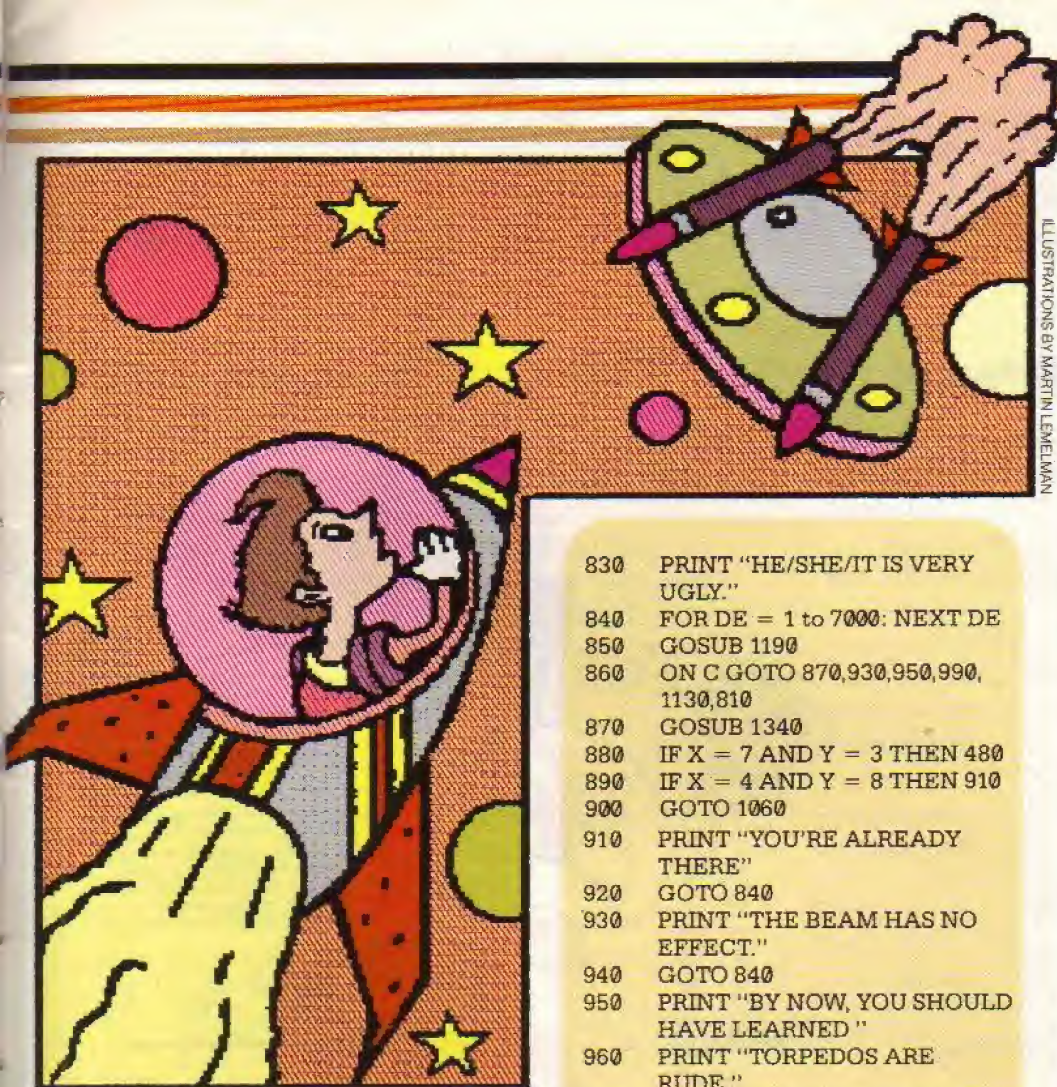
10  B = 0:A = 0:F = 0:G = 0
20  DIM N$(15)
30  HOME
40  PRINT "WHAT IS YOUR
    NAME?"
50  INPUT N$
60  HOME
70  IF A = 1 THEN 140
80  PRINT "YOU ARE TAKING A
    NAP IN YOUR"
90  PRINT "STARSHIP, THE SS
    FLEABITE"
100 PRINT "SUDDENLY, AN ALIEN
    VESSEL APPEARS."
110 PRINT "IT COULD BE SPACE
    PIRATES!"
120 PRINT "YOU LEAP FOR THE
    CONTROL PANEL"
130 GOTO 150
140 PRINT "THERE'S NOTHING
    THERE"
150 FOR DE = 1 TO 7000: NEXT DE
160 IF F = 0 THEN 190
170 G = G + 1
180 IF G = 3 THEN 1100
190 GOSUB 1190
200 ON C GOTO 210,250,310,390,
    1130,70
210 GOSUB 1340
220 IF X = 7 AND Y = 3 THEN 470
230 IF X = 4 AND Y = 8 THEN 800

```

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240 GOTO 1060
250 IF A <> 1 THEN 280
260 GOSUB 1040
270 GOTO 150
280 PRINT "THE BEAM HAS NO
    EFFECT."
290 PRINT "THE ALIENS DRAW
    CLOSER"
300 GOTO 150
310 IF A <> 1 THEN 340
320 GOSUB 1040
330 GOTO 150
340 PRINT "TORPEDO
    LAUNCHED!!!"
350 FOR DE = 1 TO 3000: NEXT DE
360 PRINT "THE ALIENS DESTROY
    YOUR TORPEDO AND LAUNCH
    THEIR OWN."
370 PRINT "IT WILL HIT YOU IN 30
    SECONDS"
380 F = 1: GOTO 440
390 IF A <> 1 THEN 420
400 GOSUB 1040
410 GOTO 150
420 PRINT "A STRANGE NOISE
    COMES OUT OF YOUR RADIO."
430 PRINT "IT SOUNDS LIKE 7 DOG
    BARKS FOLLOWED BY 3 CAT
    SCREECHES."
440 PRINT "THE ALIEN SHIP
    VANISHES."
450 A = 1
460 GOTO 150
470 HOME
480 PRINT "YOU ARE IN ORBIT
    AROUND A SMALL PLANET."
490 PRINT "IT IS DESERTED."
500 IF B = 1 THEN 530
510 PRINT "BUT YOUR SHIP'S SEN-
    SORS SPOT A SMALL OBJECT
    FLOATING NEARBY."
520 PRINT "IT LOOKS LIKE A
    BOMB"
530 FOR DE = 1 TO 7000: NEXT DE
540 GOSUB 1190
550 ON C GOTO 560,620,710,780,
    1130,480
560 GOSUB 1340
570 IF X = 4 AND Y = 8 THEN 800
580 IF X = 7 AND Y = 3 THEN 600
590 GOTO 1060
600 PRINT "YOU'RE ALREADY
    THERE!"
610 GOTO 530
620 IF B <> 1 THEN 650
630 GOSUB 1040

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830 PRINT "HE/SHE/IT IS VERY
    UGLY."
840 FOR DE = 1 TO 7000: NEXT DE
850 GOSUB 1190
860 ON C GOTO 870,930,950,990,
    1130,810
870 GOSUB 1340
880 IF X = 7 AND Y = 3 THEN 480
890 IF X = 4 AND Y = 8 THEN 910
900 GOTO 1060
910 PRINT "YOU'RE ALREADY
    THERE"
920 GOTO 840
930 PRINT "THE BEAM HAS NO
    EFFECT."
940 GOTO 840
950 PRINT "BY NOW, YOU SHOULD
    HAVE LEARNED "
960 PRINT "TORPEDOS ARE
    RUDE."
970 PRINT "THE ALIENS VAPOR-
    IZE YOUR SHIP."
980 GOTO 1170
990 PRINT "AFTER A FEW SEC-
    ONDS, YOU HEAR"
1000 PRINT "AN ALIEN VOICE SAY:
    WELCOME"
1010 PRINT "TO THE PARTY. WHAT
    TOOK YOU SO LONG?"
1020 GOTO 1170
1030 GOTO 1180
1040 PRINT "THERE'S NOTHING
    THERE, CAPTAIN ";N$
1050 RETURN
1060 PRINT "WHERE ARE YOU?"
1070 PRINT "THOSE CO-ORDI-
    NATES WERE WRONG."
1080 PRINT "YOU ARE LOST IN
    SPACE"
1090 GOTO 1170
1100 PRINT "TORPEDO HIT!!"
1110 PRINT "YOU'RE STUCK IN
    SPACE"
1120 GOTO 1170
1130 PRINT "YOU GO INTO HYPER-
    SPACE AND"
1140 PRINT "ARE TRANSPORTED
    TO ANOTHER PART"
1150 PRINT "OF THE GALAXY"
1160 PRINT "YOU GO BACK TO
    SLEEP"

```

```

640 GOTO 530
650 PRINT "SLOWLY THE TRAC-
    TOR BEAM DRAWS THE"
660 PRINT "OBJECT TO THE SS
    FLEABITE"
670 B = 1
680 PRINT "IT'S NOT A BOMB—
    JUST A LARGE TIN CAN."
690 PRINT "INSIDE ARE 4 PING-
    PONG BALLS AND 8 RED
    CUBES."
700 GOTO 530
710 IF B < > 1 THEN 740
720 GOSUB 1040
730 GOTO 530
740 PRINT "TORPEDO
    LAUNCHED!!!"
750 PRINT "OBJECT
    DESTROYED!!"
760 B = 1
770 GOTO 530
780 PRINT "THERE IS NO
    RESPONSE"
790 GOTO 530
800 HOME
810 PRINT "YOU ARE NEAR A
    LARGE SPACE STATION"
820 PRINT "AN ALIEN FACE FILLS
    YOUR VIEWSCREEN"

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1170 PRINT "END OF GAME"
1180 END
1190 HOME
1200 PRINT "STARSHIP CONTROL
    PANEL"
1210 PRINT "WHAT ARE YOUR IN-
    STRUCTIONS,"
1220 PRINT "CAPTAIN ";N$;"?"
1230 PRINT
1240 PRINT "1. START ENGINES"
1250 PRINT "2. TRACTOR BEAM"
1260 PRINT "3. MEGABOOM
    TORPEDO"
1270 PRINT "4. MAKE RADIO
    CONTACT"
1280 PRINT "5. GET OUT OF HERE—
    QUICK"
1290 PRINT "6. VIEWSCREEN"
1300 INPUT C
1310 IF C < 0 OR C > 6 THEN 1190
1320 PRINT
1330 RETURN
1340 PRINT "INPUT NEW CO-ORDI-
    NATES X,Y"
1350 INPUT X,Y
1360 PRINT
1370 PRINT "THE WARP ENGINES
    START UP."
1380 PRINT "YOU ZOOM THROUGH
    SPACE"
1390 FOR DE = 1 TO 3000: NEXT DE
1400 RETURN

```

Send Us Your Programs

If you've written a program you'd like us to print, send it in. Include a note telling us your name, address, age, T-shirt size and type of computer. If we like it, we'll print it and send you \$25.

All programs must be your own original work. We cannot return programs. Please do not send disks.

Send your program to:

Basic Training
3-2-1 CONTACT Magazine
1 Lincoln Plaza
New York, N.Y. 10023

Correction

In our December 1986 issue, there was an error in the TI 99/4A adaptation of "Time Machine." It should include the instruction to delete line 10 of the Apple version.

Any Questions?

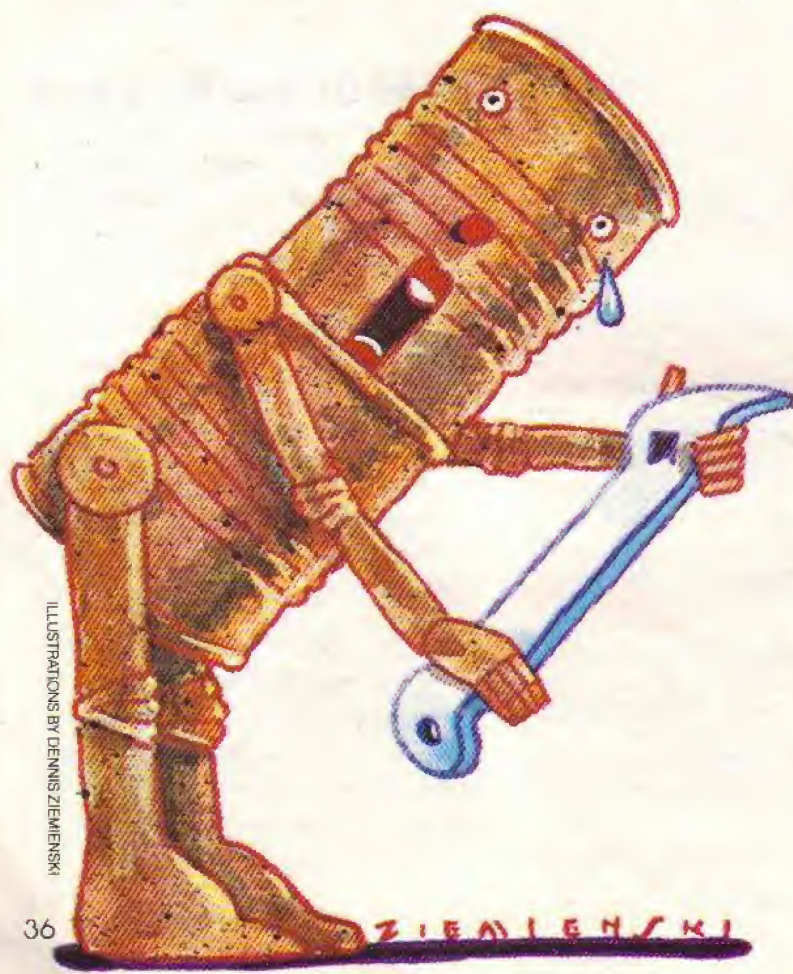
How do radios get different stations?

Your voice travels through the air on sound waves. Radio messages travel through the air on invisible waves, too. They're called—what else?—radio waves. Inside your radio is a receiver. It catches the radio waves coming from the station and turns them back into sound.

If your radio caught all the waves at the same time, you would hear dozens of radio stations all at once. The trick is to just pick up the radio waves you want. To do this, each station sends out waves that vibrate at different rates.

The number of times a radio wave vibrates is called *frequency* (FREE-quen-see). The numbers on your radio measure frequency. The higher the number, the more the waves are vibrating. When you turn the dial, you are setting your radio to catch one frequency at a time. In this way, you can tune in to your favorite station.

Question sent in by Senri Walford, Sun Prairie, WI.



Why do cans rust? Hold it! Not all cans rust. If you see a rusty can, there is some iron in it. Anything made with iron—such as cars and nails—might rust. When water or damp air comes in contact with iron, rust begins to form. But aluminum cans, from which most soda pop cans are made, contain no iron. So they never rust.

Before anything begins to rust, oxygen has to get into the act. It combines with the iron to form iron oxide. Then the iron oxide combines with the water. And yuck... you have a rusty nail or can.

What's bad about rust is that it eats away, or *corrodes*, the surface of whatever it forms on. That makes the metal weaken. Rust can cause nails to break off and holes to appear on cars.

But the reddish-brown substance isn't permanent. If you catch it before it becomes too thick, you can remove it. Just scrub it with some water or cleaning powder.

Question sent in by Danny Burgess, Flushing, NY.

Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?
3-2-1 CONTACT
P.O. Box 599
Ridgefield, NJ 07657

What's so good about gold?

Gold is not better or more useful than other metals. But compared to metals like silver or copper, there isn't much gold around. So people are willing to pay lots of money to get what little there is.

Actually, gold by itself isn't of much use for anything. It's too soft. To harden gold, so that things can be made from it, other metals must be added. Even fine jewelry made of 18-karat gold is only 75 percent pure. The rest is another metal—such as silver, copper, nickel or zinc.

All gold isn't used for decoration. Some is used in machines. For example, a thin coating of gold can carry electricity well. So, it's used for tiny electrical circuits inside some computers and TVs.

Still, because gold is beautiful and valuable, its most popular use is for jewelry. In fact, half of all the gold mined in the world ends up as rings, bracelets, watches and necklaces!

Question sent in by Mathew Todd Wilson, Anchorage, KY.



What causes a mirage? Sometimes when it's very hot, you might think you see a pool of water on the ground far away. The same thing can happen in the middle of a hot desert. But the water is not really there—it's just a mirage.

To understand how a mirage works, put a pencil in a glass of water. The pencil looks bent, but it's not. The light rays passing through the water are, however. When the bent light rays bounce off the pencil and into your eyes, the pencil looks crooked.

During a mirage, the pool of water you see is actually a bent reflection of the blue sky. If the ground is very hot, the air just above the ground is also very hot—hotter than the air higher up. Light rays coming down from the sky are bent by this change in temperature. If the light heads up toward your eyes, you see blue. You think the ground is covered with water. But better not drink the mirage. . . . All you'll get is a mouthful of sand!

Question sent in by David Fleck, Fort Wayne, IN.



Extra!

by Ellen R. Mednick

Hold on! You're not finished yet!
There's plenty more coming your way
in this month's Extra!

Answers on the Did It! page.

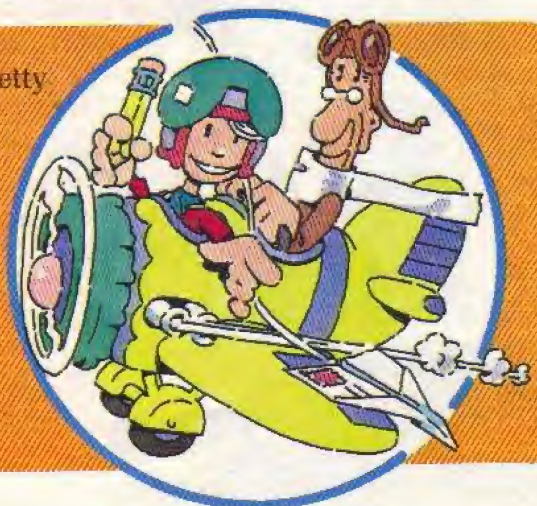
Pyramid Treasure

We've hidden an Egyptian treasure at the top of the pyramid. Start at the entrance and wind your way through the maze until you reach the treasure.



Golden Days You read all about some pretty neat senior citizens in this month's CONTACT. Tell us in 100 words or less about your favorite older person. What do the two of you share? Why is that person special to you? Our favorite entries will receive 3-2-1 CONTACT T-shirts.

Send your story to: **3-2-1 CONTACT**
Golden Days
P.O. Box 40
Vernon, NJ 07472





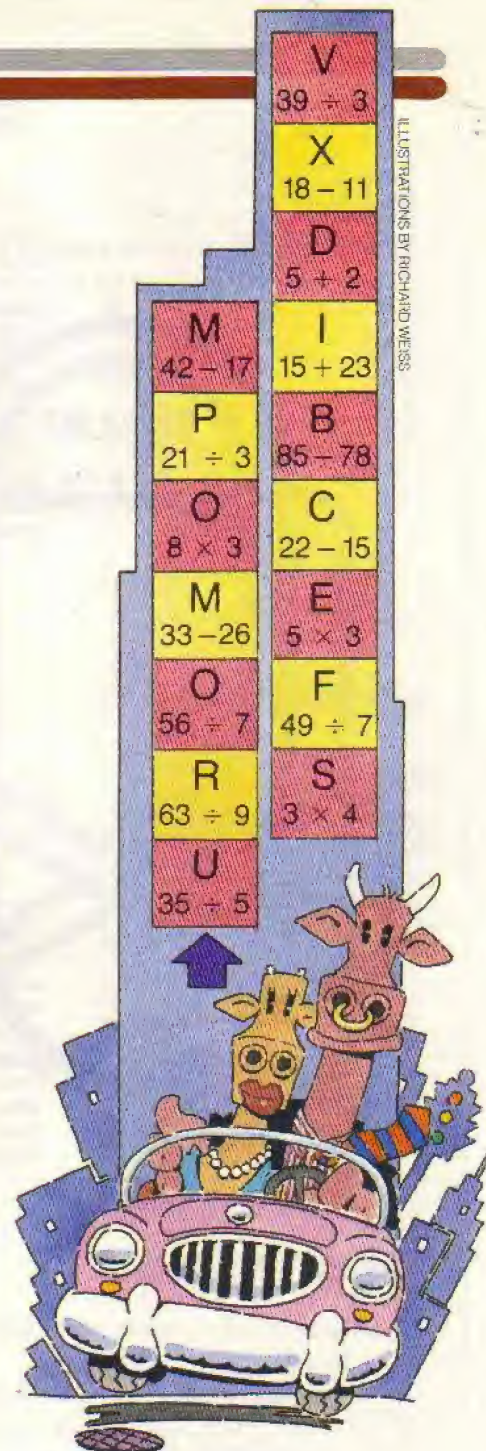
Group Search

What do the Talking Heads, The New Edition, and Bananarama all have in common? They are all rock groups. Animals like to hang around in groups, too. See how many animal "groupies" you can find hidden in this word search. The names of animal groups are written in CAPITAL letters and go across, backwards, up, down or diagonally. When you're finished, the leftover letters will spell out the name of another famous, rock 'n roll group.

KENNEL (dog)
LEASH (fox)
GAGGLE (goose)
WATCH (nightingale)
NEST (rabbit)
HERD (elephant)
LITTER (pig)
FLOCK (swan)
BLOCK (sheep)
BEVY (quail)
TEAM (horse)
TRIP (seal)
SLOTH (bear)
PACK (wolf)



L	E	A	S	H	W	D	I
E	L	G	G	A	G	Y	H
N	E	S	T	R	V	T	E
N	S	C	T	E	O	K	R
E	H	M	B	L	O	C	K
K	E	A	S	A	I	O	C
T	R	E	T	T	I	L	A
S	D	T	R	I	P	F	P



Building Bonanza

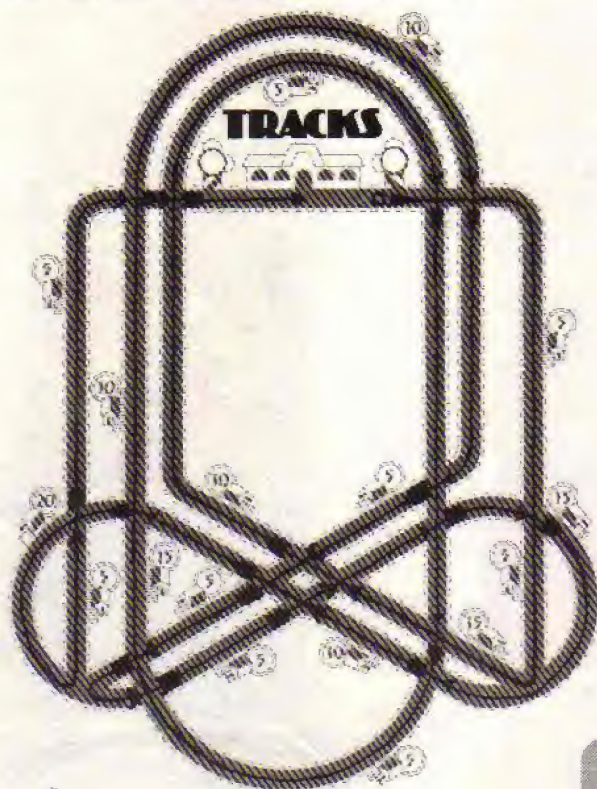
Use the bricks on our miniature Sears Tower to solve this riddle: **Where do cows go on their dates?** (Sent in by Ainsley Stelling, Midland, Texas.)

Each brick contains a math problem to solve and a letter of the alphabet. If the answer to the problem is seven, cross out the brick (and letter). The letters in the remaining bricks spell out the answer to the riddle.

Did It!

Tracks

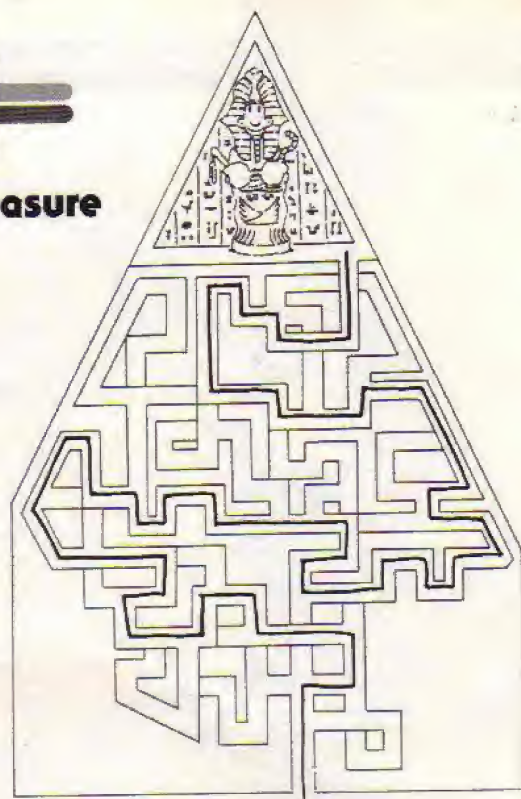
There are many different ways to go. Here is the ride we took to pick up all 150 passengers.



Pyramid Treasure

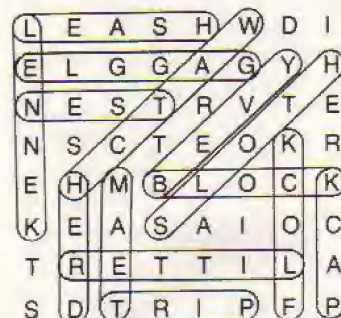
Building Bonanza

Answer:
Moo-vies



Group Search

Answer: Dire Straits



Thanks to our student intern
Sally Rose for her help in
putting this issue together.

Crazy Computer

1. The sandwich is made with floppy disks instead of bread.
2. The printer is printing paper dolls.
3. There are space invaders on the window pane.
4. The joystick cable is a snake.
5. The joystick is a candle
6. The video screen is an aquarium.
7. The keyboard cable is a rope.
8. There is a phonograph record in the disk drive.
9. There is a die in the keyboard.
10. The disk drive has teeth in it.
11. The floppy disk is a triangle.
12. There is a floppy disk in the sandwich the kid is holding.
13. The computer is connected to a garden hose.

Connie's Computer Chemistry

There are 17 ounces in test tube #3 and 4 ounces left of chemical C.

Next Month!

Here's a quick look at what's ahead in next month's 3-2-1 Contact:

Secret House

You may not be home, but your house is busy all day. See all the action in our magnificent micro-photographs!

Miracles in the Movies

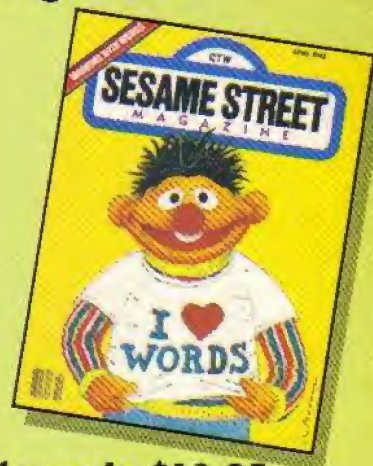
Every day, movie-makers make the impossible seem real. It's science, not magic—and we show you how it's done.

Plus
Tomorrow's News Today
and much more.

LEARNING IS FUN ...

Sesame Street Magazine

Big Bird and his delightful friends bring dozens of playful surprises, ten terrific times a year. (It's the entertaining education that Sesame Street does best!) Puzzles, cut-outs, games, A-B-C's, 1-2-3's...there's all the magic of the TV super-series in every colorful issue.



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The Electric Company Magazine

It's amusing, playful, absorbing, and educational for beginning and young readers ages 6 to 10. Enjoy ten colorful issues filled with puzzles, games, cut-outs, stories, jokes...and sunny smiles.



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3-2-1 Contact

An entertaining, informative adventure in science and technology for 8 to 14-year-olds. Each of CONTACT's ten big issues is packed with puzzles, projects, experiments, and colorful feature stories. PLUS a new ENTER computer section with programming, news and reviews. A fun, involving way to learn!



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3-2-1 **CONTACT**





Let Oreo® Cookies
put you in the Mickey Mouse Club!



Save \$2.00 when you join.

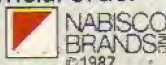
It's true. You and your friends can become official members of the new Mickey Mouse Fan Club for one full year. And Oreo® can save you \$2.00 on your membership.

Here's what Mickey sends each new member:



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- Personalized Membership Card
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- Exciting gifts
- Mickey's Clubhouse News. (One now. Three updates throughout the year!)

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ONLY \$5.95 — A \$7.95 value

For each Mickey Mouse Club Membership ordered, send:

- One (1) brand seal from a package of any variety of OREO® Chocolate Sandwich Cookies (16 oz. or larger).
- A check or money order for \$5.95 (for each membership request) made payable to: Walt Disney Mickey Mouse Fan Club. (No cash please.)
- This official order form. Complete and mail to: Walt Disney Mickey Mouse Fan Club, Dept. ND, 5959 Triumph St., Commerce, CA 90040.

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